3.5 WILDLIFE

3.5.1 SCOPE OF ANALYSIS AND ANALYSIS METHODS

This chapter analyses the direct, indirect, and cumulative effects of motorized use on selected wildlife species known to occur within the Bitterroot National Forest boundaries in Montana (Figure 1-1 in Chapter 1). Exceptions to this, due to species or habitat distribution, home range size, linkages between suitable habitats, modeling methodologies, or other considerations, will be explained in the appropriate affected environment section. The cumulative effects analysis area is defined for each species with an explanation of why that is an appropriate area for that species. Effects of motorized use to wildlife within the portion of the Bitterroot National Forest in Idaho are not assessed because that part of the Forest (with the exception of the Magruder Corridor) is entirely within the Selway-Bitterroot or the Frank Church – River of No Return Wilderness Areas, where motorized use is already precluded by law.

Some elements of wildlife habitat require a detailed analysis and discussion to determine potential effects on particular species. Other elements may not be impacted or are impacted at a level which does not influence the species or their occurrence. Some species can be adequately addressed through project design. In these cases a detailed analysis is not necessary and was not conducted.

The level of analysis depends on the existing habitat conditions, the intensity of the proposed activities, the magnitude of the actions, and the risk to the resources. The Forest Plan and Forest Plan monitoring reports, Montana Natural Heritage Program, Forest, and District wildlife databases and survey records were reviewed to determine the potential for threatened, endangered, sensitive, and management indicator species occurring in the wildlife analysis area. A species was selected for detailed analysis if it was known to be present within the affected area and the known habitats for that species had a likelihood of being affected by the proposed activities. The Travel Management Planning Project's wildlife biologist incorporated recent scientific literature and reviewed Regional and national assessments and conservation strategies to ensure that the best available science was used for assessing impacts to wildlife species. Old growth habitat, snag habitat, elk cover percentages, and habitat criteria for other wildlife species were not analyzed because none of the alternatives would affect these habitat components.

Road and trail mileages and MVUM status were derived from the INFRA database. Mid-level habitat analysis for some wildlife species used vegetative data derived from satellite imagery through the R1-VMap project. Assumptions and limitations specific to the R1-VMap dataset are described in {Project File folder 'wildlife,' Project File document WILD-001.pdf}. Analysis methods for wildlife species are described within the individual species accounts.

3.5.2 REGULATORY FRAMEWORK

The regulatory framework providing direction for the protection and management of wildlife and habitat for the Travel Management Planning Project comes from the following principal sources.

A. Endangered Species Act of 1973 (as amended)

Section 7 of the Endangered Species Act (ESA) directs that actions authorized, funded, or carried out by federal agencies do not jeopardize the continued existence of any threatened or endangered (T & E) species, or result in the adverse modification of habitat designated as critical to these species. The Bitterroot National Forest consults with the U.S. Fish and Wildlife Service (USFWS) as required concerning the effects of projects on T & E species. The USFWS has determined that Canada lynx (Threatened) may occur on the Forest as transient individuals in secondary habitat, and that the western population of the yellow-billed cuckoo (Threatened) may occur in riparian areas with cottonwoods and willows {Project File document WILD-051.pdf}.No critical habitat for any T & E wildlife species has been delineated on the Forest. The Forest has met USFWS consultation requirements for these two species (see individual species accounts).

B. National Forest Management Act of 1976

The National Forest Management Act (NFMA) provides for balanced consideration of all resources. It requires the Forest Service to provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate, to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by the plan.

C. Forest Plan

The Bitterroot National Forest Plan (Forest Plan) (USDA Forest Service 1987a), in compliance with NFMA, establishes Forest-wide management direction including goals, objectives, standards, and guidelines for the management of wildlife species and habitats on the Forest. Direction covers old growth habitat, management indicator species, sensitive species, and T&E species.

The Forest Plan requires that habitat be provided to support viable populations of native and desirable non-native wildlife, and to maintain habitat for the recovery of T&E species (USDA Forest Service 1987a, II-3). Habitat needs of sensitive species and protection of T&E species are to be considered in all project planning (USDA Forest Service 1987a, II-21). Sensitive species are designated by each Region of the Forest Service according to the occurrence of the species and its habitat within Regional boundaries. Forests are then required to prevent declines in sensitive species populations that might lead to listing under ESA (FSM 2670.32 (4)). Region 1 sensitive species for the Bitterroot National Forest (BNF) that could be affected by the proposed action are evaluated in this document.

The Forest Plan (USDA Forest Service 1987a,) requires management of elk habitat effectiveness through the Travel Management process. Other Forest Plan standards related to maintenance of wildlife populations include standards for the amount and distribution of old growth habitat by management area, retention of snags, and maintenance of elk populations and habitat. The Record of Decision for the Forest Plan (USDA Forest Service 1987c) requires retention of 25 percent of the big game winter range in thermal cover (USDA Forest Service 1987a).

3.5.3 Affected Environment and Effects To Wildlife

A. Wildlife Species Analyzed and Summary of Effect Determinations

Species considered in this analysis include federally listed proposed, threatened, and endangered species on the latest USFWS List of Threatened, Endangered and Candidate Species for the Bitterroot National Forest {Project File document WILD-051.pdf}, Forest Service Region 1 sensitive species {Project File document WILD-090.pdf}, and Forest Plan management indicator species (MIS) (USDA Forest Service 1987a). Table 3.5-1 lists the wildlife species in these categories known or suspected of occurring on the Forest, their status, habitat preference, whether the habitat or species are present in the analysis area, and whether the habitat or species will be impacted by proposed treatments. Effects determinations for threatened, endangered and sensitive wildlife species are contained at the end of the individual species analysis sections, and are collected in the biological assessment/biological evaluation summary for this project (FEIS Chapter 3, Section 3.5.8).

Table 3.5-1 shows that the following species and their habitats were dropped from further analysis because the analysis area is outside the range of the species' known distribution or because none of the proposed activities would affect suitable habitat or populations for the species, and thus there will not be any impacts to those species from the project: Sensitive: northern bog lemming, Townsend's big-eared bat, American peregrine falcon, black-backed woodpecker, flammulated owl, Coeur d'Alene salamander, northern leopard frog, long-eared Myotis, long-legged Myotis; Management Indicator Species: pileated woodpecker.

Table 3.5- 1: Wildlife Species Considered in the Bitterroot National Forest Travel Planning Analysis Area

Species[1]	Habitat Preference and Occurrence in Project Area	Species Occurrence in Analysis Area	Species Impacted by Alternatives/ Summary Determination[2]
Canada Lynx (T)	Ø Cool, moist habitats dominated by subalpine fir/Engelmann spruce/ lodgepole pine/, generally above 6,200 feet in elevation; vertical structural diversity in the under story (such as downed logs, seedling/saplings, shrubs, forbs) for denning and abundant snowshoe hare prey; lack of	Possible transient, but BNF currently classified as secondary, unoccupied lynx habitat by USFWS	Yes/NLAA USFWS recently added lynx to their list of species that may be present on the Bitterroot National Forest (as transient individuals). Analysis in FEIS.

Species[1]	Habitat Preference and Occurrence in Project Area	Species Occurrence in Analysis Area	Species Impacted by Alternatives/ Summary Determination[2]
	human disturbance during denning (4/1-8/1).		
Yellow-billed Cuckoo (western population) (T)	Riparian areas with dense cottonwoods, willows, and shrubs. Habitat occurs along the Bitterroot River and major tributaries in valley bottom. Limited amount of marginal habitat on BNF.	Only 3 vagrant occurrences known in Bitterroot drainage. Not known to occur on the BNF	No/NE Brief analysis in FEIS despite lack of effects.
American Peregrine Falcon (S)	Cliff nesting (ledges); aerial foraging over open areas for small to medium-sized bird species prey. Nesting habitat common in west side canyons.	Numerous breeding territories known on BNF	No/NI Motorized routes do not access nesting cliffs or impact foraging habitat. No further analysis will be completed.
Bald Eagle (S)	Nesting trees/platforms near large rivers or lakes; available fish and water bird species prey. Most nests and wintering habitat occurs along river corridor in valley.	One known nest on the BNF	Yes/MIIH Analysis in FEIS
Bighorn Sheep (S)	Grasslands or open forest with steep, rocky escape terrain nearby Winter ranges generally used year round by ewe/lamb bands and young rams. Other portions of herds often migrate to summer ranges.	Several sheep herds occupy portions of the BNF	Yes/MIIH Analysis in FEIS
Black-backed Woodpecker (S)	Burned or insect-killed snag concentrations, limited to 5 or 6 years following mortality. Suitable habitat scattered across BNF.	Numerous occurrence records	No/ NI Motorized use of routes would not affect habitat or individuals. No further analysis will be completed.
Coeur d'Alene Salamander (S)	Spray zones near waterfalls or seeps in fractured bedrock. Suitable habitat limited, mostly near west side streams. Species not know to occur in Sapphire Mountains.	A few occurrence records on west side	No/NI No motorized routes in suitable habitat. No further analysis will be completed.
Fisher (S)	Moist coniferous forested types (including mature and old growth spruce/fir), riparian/forest ecotones. Suitable habitat predominantly along larger tributary streams.	Scattered occurrence records mostly in west side canyons	Yes/MIIH Analysis in FEIS

Species[1]	Habitat Preference and Occurrence in Project Area	Species Occurrence in Analysis Area	Species Impacted by Alternatives/ Summary Determination[2]
Flammulated Owl (S)	Mature and old growth ponderosa pine (possibly mixed with Douglas-fir) with snags and open understories. Suitable habitat scattered across BNF in drier forested habitats.	Numerous occurrence records; seasonal migrant	No/ NI Species is strictly nocturnal and tolerates mechanized disturbance well. Motorized use of routes would not impact habitat or individuals. No further analysis will be completed.
Gray Wolf (S)	Habitat generalist. Abundant prey availability (primarily large ungulates) and lack of human disturbance (corresponding to low road densities) preferred. Suitable habitat exists across BNF.	Several packs occupy territories that include much of the BNF	Yes/ MIIH Analysis in FEIS
Long-eared Myotis (S)	Mostly forested areas or nearby openings. Often associated with old growth forests. Roosts in buildings, caves, mines, hollow trees. Nursery sites in buildings, caves, mines, rock crevices. Most probably migrate to warmer areas for winter.	Several occurrence records exist	No/NI No known roost sites or hibernacula. Species is nocturnal and unlikely to be affected by motorized use of routes. No further analysis will be completed.
Long-legged Myotis (S)	Montane coniferous forests, often at higher elevations. Roosts in buildings, under bark, rock crevices. Nursery sites in hollow trees, buildings, rock crevices. Hibernates in caves and mines, but most probably migrate to warmer areas for winter.	Several occurrence records exist	No/NI No known roost sites or hibernacula. Species is nocturnal and unlikely to be affected by motorized use of routes. No further analysis will be completed.
North American Wolverine (S)	Large areas of unroaded security habitat in high elevation areas with persistent, deep snow cover; secure denning habitat in high elevation boulder talus or under log debris; ungulate carrion in winter. Suitable denning habitat in high elevation areas in Bitterroot and Sapphire ranges.	Scattered occurrence records, no specific den sites known	Yes/MIIH Analysis in FEIS
Northern Bog Lemming (S)	Wet riparian sedge meadows, bogs, and fens. Scattered potential habitat in wetlands and riparian areas across BNF.	Several records in bogs and riparian areas	No/NI No motorized routes in suitable habitat. No further analysis will be completed.
Northern Leopard Frog (S)	Non-forested ponds. Apparently extirpated from Bitterroot drainage.	No longer occurs in Bitterroot	No/NI No further analysis will be completed.
Western (Townsend's)	Roosts in caves, mines, rocks, and buildings. Forages over tree canopy, over riparian areas,	Several occurrence	No/NI

Species[1]	Habitat Preference and Occurrence in Project Area	Species Occurrence in Analysis Area	Species Impacted by Alternatives/ Summary Determination[2]
Big-Eared Bat (S)	or water. Potential habitat in scattered old mines, rock crevices, and cabins.	records exist	No known roost sites or hibernacula. Species is nocturnal and unlikely to be affected by motorized use of routes. No further analysis will be completed.
Western (Boreal) Toad (S)	Terrestrial habitat generalist; breeds in ponds, slow streams. Suitable habitat occurs across BNF.	Numerous occurrence records; some known breeding sites	Yes/ MIIH Analysis in FEIS
Pine Marten (MIS for old growth)	Mature and older lodgepole, subalpine fir and spruce forests with abundant down logs. Suitable habitat occurs across BNF.	Many occurrence records across BNF	Yes Analysis in FEIS
Pileated Woodpecker (MIS for old growth)	Mature and older conifer forests or cottonwood gallery forests with large snags and down logs. Suitable habitat occurs across the Forest at lower to mid-elevations.	Fairly common. Many occurrence records and known nests widely distributed across the Forest	No Motorized use of routes would not affect pileated woodpecker habitat. Motorized use of routes would have negligible effects to individuals. No further analysis will be completed.
Elk (MIS for commonly hunted species)	Habitat generalist found across the Forest. Winter range in lower elevation conifer/shrub/grasslands. Summer range in higher, mesic habitats.	Common across BNF and adjacent state and private lands	Yes Analysis in FEIS
Mountain Goat Species of interest	Winters on windswept cliffs at lower elevations; summers in subalpine and alpine habitats in high-elevation basins and ridges.	Uncommon resident in suitable habitat	Yes Analysis in FEIS

[1](T) = Threatened, (E) = Endangered, (S) = Sensitive, (MIS) = Management Indicator Species
[2] Definitions of Summary Determination Abbreviations: For TES species: NE = No effect, NJ = No jeopardy, NLAA = May affect, Not likely to adversely affect, LAA = May affect, likely to adversely affect, BE = Beneficial effect. For Sensitive Species: NI = no impact; MIIH = may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species; WIVH = will impact individuals or habitat with a consequence that the action may contribute towards federal listing or result in reduced viability for the population of species; or BI = beneficial impact.

3.5.4 EXISTING WILDLIFE HABITAT

The Bitterroot National Forest supports nearly all the vertebrate wildlife species that were present in the area prior to European settlement. Notable exceptions include the grizzly bear, Columbian sharp-tailed grouse, and northern leopard frog. Existing habitats for native wildlife species are very diverse, ranging from native grasslands and shrublands at lower elevations along the Forest boundary in the Bitterroot Valley through mid-elevation conifer forests to subalpine forests and alpine ecosystems dominated by rocky peaks at the highest elevations. Many of these habitats have been altered to some extent by forest management activities including timber harvest and the development of an extensive road system designed to facilitate timber management. Timber extraction has primarily affected lower and mid-elevation habitats, and has resulted in dramatic reductions in the amount of mature and over-mature ponderosa pine and Douglas-fir habitats across the Forest, compared to historic conditions.

Habitats in many areas of the Forest have also changed over the past century as a result of fire suppression, which has reduced the influence of periodic fire as an ecosystem process. The result of fire suppression in lower to mid-elevation habitats has been a dramatic increase in the average number of trees per acre, a trend towards forest species composition dominated by late-seral species rather than pioneer species, and increased fuel loadings that are outside the historic range. At upper elevations, fire suppression has led to an increase in the average age and size class of mixed conifer forests, as well as a decrease in size and age class diversity as the forest has become more homogenous. The consequences of long-term fire suppression, and resulting fuel buildups in areas where fire is the dominant ecosystem process, have become apparent in the past two decades as large stand-replacing and mixed-severity fires have become more common and burned large areas of the Forest. These fires have resulted in a large pulse of standing dead trees (snags) and down logs, as well as large increases in the amount of early seral habitats dominated by grasses, shrubs, and conifer seedlings.

3.5.5 Analysis Methodology

Motorized and nonmotorized access and associated human activities can impact wildlife populations and habitats. Direct effects to wildlife populations include disturbance, harassment, displacement from preferred habitats, and mortality due to increased access for hunting, poaching, and trapping, or from collisions with motorized vehicles. Indirect effects to wildlife populations include effects to habitat such as reductions in the numbers of snags and down logs resulting from removal for firewood, increased edge effects caused by the linear opening along roads, increased risk of fire, and conversion of native vegetation to invasive weeds resulting from unintentional weed seed dispersal.

Almost all of the routes proposed for motorized use in all of the alternatives already exist and are already open for motorized use by some vehicles during all or part of the year. Since motorized use and associated habitat effects such as firewood gathering already occur on or along these routes, no measureable additional effects to wildlife habitat from continued motorized use on them are expected. Therefore, the wildlife analysis does not evaluate the effects of motorized or nonmotorized use to wildlife habitat. Rather, the wildlife analysis will generally focus on effects to wildlife populations caused by human disturbance, which is often facilitated by motorized vehicles.

Two methods have commonly been used to evaluate impacts of motorized travel on wildlife: road density and distance-to-route or secure areas. An example of the first method is Lyon (1983), which assessed road density models with respect to elk habitat availability where a network of roads was being used for logging and related traffic. He recommended road density values, along with habitat values such as cover and forage availability, as components of a model to predict or measure elk habitat effectiveness (EHE). Road density thresholds were not measured as such, but were extrapolated from data on the distance at which elk appeared to avoid areas near roads. This model was incorporated into a Forest Plan standard (Forest Service 1987a, II-21) for evaluating the effects of open road density to the effectiveness of elk habitat.

Rowland et al. (2000) suggest that it may be more biologically meaningful to evaluate road effects based on distances from roads and spatial pattern of roads than on traditional road density models. Their study suggests that the overall pattern of open motorized routes and the availability of areas outside the influence zone of motorized routes may be a more important metric than motorized route density in determining impacts to elk and other wildlife. Additionally, Wisdom et al. (2004) suggest that linear distance of open motorized routes relative to the size of the watershed or other appropriate analysis area may be a key to determining the degree of impact of motorized travel on elk and other wildlife.

Travel planning on the Bitterroot National Forest is occurring at a large scale, with the analysis intended to display the general potential for impacts to wildlife and other resources over an entire landscape. Most analyses of and recommendations for, road densities have been at a smaller scale, usually at the watershed or other moderately-sized unit. Implications of a particular density category are difficult to determine outside of the general context in which it was originally reported in the literature. Analysis of open road or open motorized route (including trail) density could provide an additional tool to differentiate true potential impacts of each alternative to wildlife species.

This analysis will compare, by alternative, the potential impacts to wildlife of motorized travel as a means to differentiate potential consequences among the alternatives. Some studies have found that under certain circumstances nonmotorized travel may cause as great or greater disturbance to ungulates as motorized travel (Canfield et al. 1999). Other studies, conversely, have demonstrated that some species, such as elk, are more likely to be displaced away from routes receiving mechanized and motorized use than those receiving foot and horse travel (Wisdom et al. 2004, Grigg 2007, Naylor et al. 2009). The impacts of non-motorized travel to wildlife are not quantified in the wildlife analysis, but are understood to be cumulative to any impacts resulting from motorized travel, and are assumed to be the same for all alternatives because all routes are already open to nonmotorized use year-long. Therefore, nonmotorized use on routes will not be specifically addressed in the wildlife analysis.

Security from human disturbance is very important for many species of wildlife. This analysis will focus on the degree of security provided to several wildlife species as a result of the alternatives, and will estimate the amount of security habitat for wildlife species using several methodologies. These include:

Spring/Summer/Fall Security

- Miles of motorized routes in riparian buffers
- Elk Habitat Effectiveness
- Elk Security Area Percentage during the general big game season, and separately during the archery season
- Wildlife Core Security Area (area outside the zone of motorized influence) percentage during the summer
-

Winter Security

- Percentage of the Forest open to motorized use
- Percentage of wolverine habitat open to motorized use
- Percentage of fisher habitat open to motorized use
- Percentage of elk winter range open to motorized use
- Percentage of mountain goat winter range open to motorized use

A. Summer Travel Routes and Wildlife

Summer travel routes on the Bitterroot National Forest consist of a mix of roads maintained at some level for use by full-sized vehicles, road prisms that are no longer maintained for use by full-sized vehicles but that may be available for use by ATVs or motorcycles, and single or double-track trails that do not lie on constructed road prisms. Routes in all these categories may be open to some type of motorized use during all or part of the year, or they may be closed to all motorized use during the entire year. Use of motorized wheeled vehicles off of existing roads and trails is not currently permitted on the Bitterroot National Forest due to the 2001 Tri-State Decision (USDI/USDA Forest Service 2001b), except for travel to dispersed campsites within 300 feet of an open route. However, some illegal off-route motorized use does occur on the Forest.

The effects of roads and road use on wildlife have been well-documented. Trombulak and Frissell (2000, including extensive internal citations) reviewed the existing literature on the ecological effects of roads, and found support for the general conclusion that roads are associated with negative effects on biotic integrity in both terrestrial and aquatic ecosystems. They grouped effects into categories including: mortality from road construction and collision with vehicles; modification of animal behavior; alteration of the physical or chemical environment; spread of exotics; and increased use of areas by humans. They concluded that not all wildlife species are equally affected by roads, but overall, the presence of roads is highly correlated with changes in species composition, population sizes, and hydrologic and geomorphic processes. They also emphasized the importance to conservation of avoiding construction of new roads in roadless or sparsely roaded areas, and of removal or restoration of existing roads to benefit both terrestrial and aquatic biota.

While many studies have addressed the impacts of recreational use of roads on a variety of wildlife species, fewer address the impacts of motorized trails. However, several authors (Canfield et al. 1999, Toweill and Thomas 2002, Graves 2002) suggest that the effects of open motorized trails to wildlife are likely similar to those resulting from open roads. Other studies suggest a greater wildlife response to primary or secondary roads than to primitive roads or jeep trails (Lyon 1984, Gruell and Roby 1976, Rowland et al. 2000), while many suggest that the volume of traffic affects likelihood of wildlife response (Papouchis et al. 2001, Mace et al. 1996). Naylor et al. (2009) documented that elk in Oregon respond differently to various types of motorized and nonmotorized use of trails and primitive roads. Similarly, Ciuti et al. (2012) found that motorized vehicles had a stronger impact than nonmotorized activities on elk in Alberta. It appears, therefore, that the impacts of both motorized roads and trails to wildlife likely vary according to the type and level of use, habitat, topography, and other factors.

In a more recent literature review specific to OHVs (off-highway vehicles), Ouren et al. (2007, including extensive internal citations) found that the impacts of OHV activities on wildlife and their habitats are numerous and well documented. Networks of roads and trails fragment habitat, reduce patch size, increase the ratio of edge-to- interior, reduce habitat connectivity, and are a source of noise and other stimuli that can disturb wildlife. Off-highway vehicle use has been shown to reduce population densities of a number of wildlife species through direct mortality caused by vehicle impacts, habitat alteration, loss of vegetative cover, and disturbance (*Ibid*).

Many motorized riders are convinced that they create few disturbance impacts to wildlife, based on anecdotal observations of riding close to animals that seemed to ignore them. However, an extensive body of research literature refutes this view. Effects of disturbance events to wildlife are not always obvious, but can include accelerated heart rates and metabolic functions, displacement, reduced reproductive success, and reduced survivorship (Ouren et al. 2007, including extensive internal citations). Chabot (1991) showed that even when disturbances to elk do not induce an overt behavioral response such as running, increased heart rates associated with disturbance can result in relatively high energy expenditures. These results have been confirmed and expanded for a variety of other ungulate species (Canfield et al. 1999, including extensive internal citations).

In an eloquent controlled experiment using wild elk fitted with GPS collars, Wisdom et al. (2004) compared indicators of elk disturbance levels (movement rates and probability of flight response) resulting from off-road use by hikers, horseback riders, mountain bikers, and ATVs. Movement rates of elk were substantially higher during periods of all four off-road activities compared to periods of no human activity. Peak movement rates of elk (indicating level of disturbance) were highest during ATV activity, somewhat lower for mountain bike riding, and still lower for both horseback riding and hiking. The probability of flight response (elk running from a disturbance source) was higher during ATV and mountain bike activity, in contrast to lower probabilities observed during hiking and horseback riding. The probability of flight response declined with distance from the disturbance, but at different rates. Probability of flight response declined most rapidly during hiking, with little effect when hikers were beyond 500 meters from an elk. In contrast, higher probabilities of elk flight response continued beyond 750 meters from horseback riders and 1,640 meters from mountain bike and ATV riders. Similarly, Vieira (2000) found that elk moved twice as far from ORV disturbance than they did from pedestrian disturbance.

Since a motorized rider can cover a much greater distance than a hiker, horseback rider, or mountain biker during a day, and the area disturbed extends further from the source for motorized vehicles due to noise, the disturbance zone created by an ATV or motorcycle rider is much larger than that created by any non-motorized recreationist. This leads to the conclusion that motorized recreationists have the potential to disturb many more animals during a day than nonmotorized recreationists. Motorized recreationists are often unaware that they are disturbing animals because many of the animals move away from the source of the disturbance long before they become visible to the rider.

The Bitterroot National Forest does not have use information on most roads and trails within the Forest. Given this lack of information, and the uncertainty of the effects of motorized use on trails to wildlife, this analysis assumes that motorized use on trails has effects to wildlife similar to those from motorized use on roads. This assumption will facilitate comparison of the relative potential of each alternative to impact wildlife, and will allow a relatively large-scale analysis of impacts appropriate to the scope of the decision being made.

B. Winter Travel and Wildlife

A number of scoping comments received by the Forest in response to the Proposed Action and to the DEIS expressed the opinion that winter recreation has few, if any, effects to wildlife because animals are absent from the high elevation areas with deep snowpack favored by both motorized and non-motorized over-snow recreationists. While it is true that common, large, highly visible species such as mule deer and elk generally migrate to lower elevations with little snow, many less visible species spend the winter at high elevations, and can be impacted by over-snow recreation.

Many small mammals such as mice, voles, and shrews are active throughout the winter in the subnivian layer, which is a narrow gap that forms between the ground and the lower layer of snow as a result of residual heat in the soil. The weight of either over-snow vehicles or non-motorized over-snow recreationists can collapse snow into the subnivian layer, which in turn reduces travel, feeding, and escape opportunities for small mammals (Sanecki et al. 2006). Some studies indicate that in areas of concentrated over-snow vehicle use, small mammal communities can be reduced or eliminated (Jarvinen and Schmid 1971, Sanecki et al. 2006), which can in turn affect predators of small mammals such as weasels and marten.

Wolverines are rare carnivores that spend most of their time in upper elevation areas that retain snowpack late into the spring (Aubry et al. 2007). Wolverines appear to den in boulder talus fields or areas with down logs in high elevation basins. They may be sensitive to human disturbance from either motorized or non-motorized over-snow recreationists during the denning season, which is generally February through May. Disturbance may cause wolverines to abandon den sites and move kits a considerable distance, or may impact wolverine foraging success; either of which may reduce reproductive success.

Over-snow vehicle use access leads to increased trapping pressure for some furbearers that prefer more mesic habitat conditions generally found at higher elevations or in riparian habitats, such as marten, fisher, lynx, and wolverine. Trapping season for these species is limited to the winter months, and most trappers prefer the relatively easy access to suitable habitat provided by over-snow vehicles. Lack of over-snow vehicle access dramatically reduces the amount of trapping pressure for these species, several of which are classified as Sensitive or are federally listed.

Wildlife managers have traditionally focused on providing winter habitat for big game. Winter is the time of year when energy expenditure invariably exceeds intake, due to increased metabolic demands and energetic costs of locomotion, coupled with decreased forage quality and availability. Ungulates typically lose a substantial percentage of their body weight under these conditions. Severe weight loss leads to increased risk of mortality through starvation and predation, and lower production and survival of calves and fawns the following spring. Humans can exacerbate these impacts through winter travel. Disturbance can cause animals to run through deep snow, which is very energetically demanding (Clark 1999). Animals that do not flee often exhibit an increased heart rate, which may result in elevated energy expenditures. Lastly, animals may be displaced from important wintering areas to lower-quality habitats, thus reducing their chances of survival and successful reproduction (Canfield et al. 1999).

All types of human activity, including both motorized and nonmotorized travel, can cause disturbance and displacement of wintering big game. The literature shows a broad range of conclusions regarding the impacts of different types of uses (Canfield et al. 1999). The type of use may be less important than the frequency and predictability of the use. Generally, big game animals are most affected by unpredictable activities such as off-trail motorized or non-motorized over-snow recreational use, and light use of trails for these activities (Cassirer et al.1992, Clark 1999, Tyers 1999). They tend to habituate to predictable activities occurring on well-used routes at regular intervals (Aune 1981), because this is energetically less costly than fleeing. Off-trail travel was deemed potentially the most detrimental because it occurs over larger areas and is less predictable than use of designated routes (Clark 1999). However, off-trail use may have limited impact on wintering animals if use levels are low enough simply because they are rarely disturbed.

While all big game species are potentially affected by winter travel, some species are more at risk than others. Moose are among the most likely to be affected, because they often winter at higher elevations where there is adequate snow cover to support winter recreational use by humans. In addition to the greater likelihood of experiencing disturbance from human activities than in areas with shallow snow, energetic costs of fleeing from disturbance are much greater in deep snow (Tyers 1999).

Although they may readily habituate to human presence under certain circumstances, bighorn sheep may also be rather sensitive to disturbance from human activity (Legg 1999). Bighorn sheep have specific winter habitat requirements, and as a result, suitable winter range is normally much less abundant than for most other big game species. Sheep displaced from high-quality winter range due to disturbance are frequently forced to use sub-optimal habitat.

Similar to bighorn sheep, mountain goats are generally found in very restricted winter habitats. Mountain goats probably winter in the harshest environments of any big game animal on the Forest, and therefore have the least margin for unnecessary energy costs without impacts on survival and reproduction. Although they are often found in inaccessible locations where human travel may be unlikely (Varley 1999), improved over-snow vehicle technology now allows human access to areas of mountain goat winter habitat that previously could not be reached. Therefore, goats may be increasingly vulnerable to disturbance from winter travel.

Many elk on the Forest winter in areas with low snow cover that is not conducive to winter recreational travel. Energetic costs of disturbance are also lower in these areas than in places with deep snow. Although for these reasons elk may be less susceptible to some types of disturbance such as snowmobiling or skiing (Clark 1999) than some other big game species, the potential remains in many areas for elk to be negatively impacted by winter travel.

Many early-flowering high elevation plants remain active and grow slowly throughout the winter using low levels of light and carbon dioxide that filter through loose, uncompacted snow (Salisbury 1984). Snow compacted by recreational activities blocks the transmission of light and gases through the snowpack, which in turn reduces or eliminates the ability of these plants to develop under the snow. Studies have shown that alpine plants in areas where the snow is compacted flower up to a month later than the same species growing in areas of uncompacted snow (Baiderin 1983). Over time, compaction tends to favor species that flower later in the summer or fall, and can lead to the loss of spring-flowering plants from localized plant communities (*Ibid*). This can impact wildlife populations because many species depend on the nutrition provided by early spring plants to initiate reproduction (Negus et al. 1977).

Use of forest roads by wheeled vehicles during the winter is generally limited or precluded by snowpack, and is considered to be a minor contributor to disturbance impacts to wildlife species. Most roads open to motorized use during the winter receive more use by over-snow vehicles than by wheeled vehicles. Disturbance impacts on these roads during the winter is included as part of the winter analysis that evaluates the percentage of the Forest open to over-snow vehicle use for most wildlife species. One exception is bighorn sheep, since they use well-defined winter ranges that generally have too little snow to support much over-snow vehicle use.

3.5.6 ANALYSIS OF PROJECT EFFECTS TO SELECTED WILDLIFE SPECIES

A. Canada Lynx (*Lynx canadensis*) (Threatened)

Legal Status

On July 2, 2013 the United States Fish and Wildlife Service (USFWS) issued an updated species list of threatened, endangered and candidate species that may be present on the BNF. {Project File document WILD-051.pdf displays the latest update of the list}. The July 2, 2013 update of the species list added Canada lynx as a transient species that may be present in secondary/peripheral lynx habitat on the BNF (*Ibid*). Prior to that update, Canada lynx was not included on the USFWS list for the BNF. In February 2009 the USFWS published a revised Canada lynx critical habitat designation {Project File document WILD-170.pdf}. The entire BNF, including the project area, is not within or in close proximity to designated lynx critical habitat.

In an amendment {Project File document WILD-006.pdf} to the 2005 Canada Lynx Conservation Agreement {Project File document WILD-007.pdf}, the Bitterroot National Forest was classified as unoccupied lynx habitat by the USFWS and the Forest Service. The recent addition of lynx to the USFWS list of threatened, endangered and candidate species that may be present on the BNF did not change the BNF's classification as unoccupied lynx habitat under the amended Canada Lynx Conservation Agreement.

The Record of Decision (ROD) (USDA Forest Service 2007d) for the Northern Rockies Lynx Management Direction (NRLMD) FEIS (USDA Forest Service 2007c) became effective July 16, 2007. The ROD amended the management direction in the selected alternative into all Forest Plans in the planning area, including the Bitterroot National Forest Plan. The NRLMD FEIS management direction incorporates the Terms and Conditions that USFWS issued in their Biological Opinion and Incidental Take Statement (USDI Fish and Wildlife Service 2007). Direction in the NRLMD ROD applies to mapped lynx habitat on National Forest System lands presently occupied by lynx, as defined by the Amended Lynx Conservation Agreement between the Forest Service and USFWS {Project File document WILD-007.pdf}.

Since the Bitterroot National Forest is classified as unoccupied lynx habitat, Regional policy requires the Forest to consider the management direction in the NRLMD FEIS and ROD when designing management actions in unoccupied lynx habitat, and to analyze the effects of project activities to lynx. However, the NRLMD ROD (USDA Forest Service 2007d) states that Forests classified as unoccupied lynx habitat, such as the Bitterroot National Forest, are not required to follow the direction in the NRLMD ROD (*Ibid)*. This analysis documents the Forest's consideration of the management direction in the NRLMD.

The Bitterroot National Forest submitted a Biological Assessment (BA) for lynx {Project File document WILD-171.pdf} to the U.S. Fish and Wildlife Service (USFWS) on August 9, 2013 to initiate informal consultation on effects to lynx from the Travel Management Project. The lynx BA analyzed the effects to lynx of implementing Alternative 1. It also specified that implementing all or part of Alternative 4 would result in fewer effects to lynx than Alternative 1. The lynx BA concluded that the effects determination for implementing Alternative 1 is May Effect, Not Likely to Adversely Effect. USFWS reviewed this lynx BA and issued a Letter of Concurrence dated September 6, 2013 {Project File document WILD-172.pdf}.

Effects Analysis Methods

Compliance with the Objectives, Standards and Guidelines contained in the Northern Rockies Lynx Management Direction FEIS is evaluated for each of the alternatives. In addition, the area of mapped lynx habitat open to over-snow vehicles, and the miles of roads and trails open to wheeled motorized use in mapped lynx habitat were evaluated for each of the alternatives.

Affected Environment

Lynx Habitat Status

The Forest contains suitable lynx habitat in many mid and higher elevation areas. Lynx habitat in the Bitterroot National Forest has been identified through an interdisciplinary process with USFWS to be generally areas exceeding 6,200 feet in elevation that support vegetation types dominated by subalpine fir or spruce {Project File document WILD-061.pdf}. This effectively eliminates the low-to-mid-elevation forests dominated by ponderosa pine, Douglas-fir, and/or grand fir that are common in many areas of the Forest as lynx habitat. Lynx habitat is generally limited to the higher elevations in the Sapphire Mountains, and to forested areas along streams and in many of the higher basins and north aspects in the Bitterroot Mountains. The many steep, rocky areas in the Bitterroot Mountains are not considered lynx habitat. Consequently, lynx habitat in much of the Bitterroot Mountains is highly fragmented by these steep, rocky areas. The current Bitterroot National Forest lynx habitat map {Project File document WILD-061.pdf} classifies about 546,200 acres (48.5%) of the Montana portion of the Forest as potential lynx habitat. About 514,000 acres are classified as lynx denning habitat, and about 32,200 acres are classified as lynx foraging habitat. These figures likely overstate the amount of existing lynx habitat on the Forest because they have not been updated to reflect the fires that occurred in 2000 or later. In addition, research published since 2000 indicates that lynx in Montana are more restricted to forests dominated by spruce and true fir than previously understood (Squires et al. 2010; Squires et al. 2008). Many areas on the Forest mapped as lynx habitat in 2000 do not support spruce/fir forests, and likely do not provide suitable lynx habitat.

Lynx Population Status

The Montana Natural Heritage Program maintains a database of species observations (Montana Natural Heritage Tracker). A query of the database dated August 2013 {Project File document WILD-166.pdf.} located 41 records of lynx observations totaling 51 lynx in Ravalli County from 1910 through 2009. These observations are categorized as verified or anecdotal. Verified observations or records are those that scientifically document a lynx by identifying physical remains, live-captured animals, or DNA samples {Project File document WILD-006.pdf}. Anecdotal observations are generally tracks and reported sightings where physical evidence is lacking. In total, there are 26 verified (physical remains from trapping) lynx observations from Ravalli County from 1910 to 1987. The location recorded in the Tracker database indicates that 21 of these observations were located on BNF lands, while 5 observations were located on state or private land within 10 miles of the Forest. The two most recent verified records occurred in 1987. There are a total of 25 anecdotal records (no physical evidence) from Ravalli County from 1964 to 2009. The location recorded in the Tracker database indicates that 15 of these observations were located on BNF lands, while 10 observations were located on state or private land within 10 miles of the Forest. Anecdotal sightings may include repeat sightings of the same individual.

Montana Department of Fish, Wildlife and Parks (FWP) regulates trapping in Montana and requires trappers to present all pelts of bobcats, otter, marten, fisher, wolverine and swift fox to FWP personnel for pelt tagging. Lynx can no longer be legally harvested, but any lynx taken incidentally must be turned in to FWP personnel within 5 days. FWP records dates, locations and numbers of these harvested animals and keeps official records of these harvested species. FWP trapping records for Ravalli County show that 30 lynx were harvested by trapping between 1975 and 2010. The last lynx trapping records in Ravalli County in the official FWP database are two animals captured during the 1986-1987 license year. Montana Natural Heritage Tracker data for this same time period shows 26 lynx harvested from Ravalli County.

Included in the Montana Natural Heritage Tracker data are one lynx taken during trapping year 1994-1995, and two taken during trapping year 2008-2009 that are absent from FWP's official trapping records. Locations shown in the Tracker database for all three of these lynx are on private land off of the BNF. The 1995 record is shown as being located in the lower Rye Creek drainage, while the 2009 record is shown as being located along Hwy. 93 just north of Stevensville. Both of these locations are miles from the nearest lynx habitat. Any lynx caught in a trap since the lynx season closed in 2000 is defined as incidental take. An email from FWP's Statewide Furbearer Coordinator Brian Giddings dated 4/21/2011 confirms that no incidental lynx captures have been reported in Ravalli County since legal lynx harvest ended in 2000 {Project File document WILD-167.pdf.}. Since there is a discrepancy between the FWP official trapping records and the Montana Natural Heritage Tracker records concerning these particular observations, the observations are not considered reliable, and thus do not represent verified observations of lynx. While evaluating the validity of lynx records for their publication, McKelvey et al. (2000a) stated that "If there was a discrepancy between published tabulations of harvest data and records obtained directly from state or provincial agencies, we assumed the latter to be more reliable and used those data in our analyses."

In addition to the information from the Montana Natural Heritage Tracker database and FWP trapping records, several collared lynx captured in Canada and transplanted to Colorado were radio-located in Montana (Devineau et al. 2010). Eight of Colorado's 218 reintroduced lynx made 10 forays into Montana, lasting from 1 to 217 days {Project File document WILD-168.pdf.}. Two of the individuals traveled through the Bitterroot National Forest. In 2005 one individual spent 91 days in Montana, including traveling through the Pryor, Absaroka, Gallatin, Madison and Tobacco Root ranges, past Anaconda and presumably over the Sapphires before being found dead along Hwy. 93 near Stevensville. In 2007, one individual spent 98 days in Montana, travelling west out of Yellowstone into the Gravelly Range, then northwest through the Tobacco Root, Flint Creek and northern Sapphire ranges before passing Lolo and heading into Idaho (*Ibid*). These individuals are considered transient lynx because they passed through many miles of habitat and non-habitat without any indication that they had established a home range.

The Bitterroot National Forest was part of a pilot project to test the effectiveness of lynx monitoring using hair snare methodology in 1999. This methodology became the established USFS lynx survey protocol (McDaniel et al. 2000). The Forest subsequently used this protocol to survey for lynx in 2001; 2002-3, 2010, 2011 and 2013. In the earlier years, the Forest established a grid of sampling stations scented with a lynx attractant near the Continental Divide east of Lost Trail Pass, an area that has been identified as a potential lynx linkage area (USDA Forest Service 2007d). In 2002-03, 2010, 2011 and 2013, the same area was resampled but stations were also established in various other sites in the East Fork drainage and near Woods Creek Pass and Nez Perce Pass in the West Fork. Lab analysis of hair samples collected at the sampling stations identified hair from a number of different mammal species, but none of the samples contained lynx hair {Project File folder 'forest_plan_and_monitoring,' Project File document FPMON-036.pdf; and Project File documents WILD-060.pdf, WILD-189.pdf and WILD-190.pdf}.

The Forest used a broader spectrum survey protocol to detect forest carnivores in these and other areas in the winters of 2012-2013 and 2013-2014. Motion-activated cameras were aimed at trees where pieces of deer or beaver meat had been hung to attract predators. The cameras captured photos of bobcats, martens, fishers and wolverines, but no lynx. Hair collected from animals scaling the trees to reach the bait was analyzed to determine species. Again, lab analysis of these hair samples identified a number of different mammal species, but none of the samples contained lynx hair {Project File documents WILD-173.pdf and WILD-190.pdf}. This multi-carnivore survey methodology is being implemented at an expanded network of sites in the winter of 2014-2015. Data is still being collected and analyzed.

While lack of detection cannot be interpreted as confirmation that lynx are absent, an ongoing, multi-year effort using state of the art sampling methodologies in areas of mapped lynx habitat where lynx would be likely to occur has not produced any evidence that lynx are present on the Bitterroot National Forest. The latest scientific estimate of the current distribution of lynx in western Montana does not include any areas within or adjacent to the Forest (Squires et al. 2013).

However, lynx are known to be highly mobile and have a propensity to disperse long distances, particularly when prey becomes scarce (Mowat et al. 2000). Lynx also make long distance exploratory movements outside their home ranges (Aubry et al. 2000). For analysis purposes, it is recognized that transient lynx may be present on the Forest now or in the future.

Potential Impacts of Summer Motorized Use to Lynx

Review of several scientific publications indicates that there is some debate over the effects of roads to lynx. In their biological opinion on the effects of the Northern Rockies Lynx Management Direction (NRLMD) FEIS (USDA Forest Service 2007c), USFWS reviewed the existing information and concluded that within occupied lynx habitat, "The best information suggests that the types of roads managed by the Forest Service in the NRLA (Northern Rockies Lynx Amendment area) do not likely adversely affect lynx" (USDI Fish and Wildlife Service 2007). In the same document, USFWS further found that "Unlike paved highways, Forest roads rarely receive motorized use at levels that create barriers or impediments to lynx movements. Lynx have been documented using less-traveled roadbeds for travel and foraging" (Parker 1981; Koehler and Brittell 1990); "preliminary information suggests that lynx do not avoid roads (Ruggiero et al. 2000) except at high traffic volumes (Apps 2000)"; "lynx show no preference or avoidance of unpaved forest roads, and the existing road density (in their study area) does not appear to affect lynx habitat selection" (McKelvey et al. 2000b). In a study conducted near Seeley Lake, Montana, Squires et al. (2010) found no evidence that lynx were sensitive to forest roads, including roads used by snowmobiles during winter. They concluded that seasonal resource-selection patterns of lynx were little affected by forest roads with low vehicular or snowmobile traffic.

On the other hand, the USFWS acknowledges that human access via Forest roads can increase the potential for mortality or injury of lynx captured incidentally in traps aimed at other species or through illegal shooting (USDI Fish and Wildlife Service 2007), although lynx harvest seasons were closed in Montana following listing in 2000 (*Ibid*). Other publications (Koehler and Brittell 1990; Aubry et al. 2000; USDI Fish and Wildlife Service 1998; Koehler and Aubry 1994; McKay 1991) agree that open roads can increase lynx vulnerability to hunting, trapping, and/or poaching. However, these concerns about increased lynx mortality only apply in areas that are occupied by lynx. Since the Bitterroot National Forest is currently classified as unoccupied lynx habitat (USDI Fish and Wildlife Service 2007), it is unlikely that motorized access on Forest roads would result in increased lynx mortality. The USDI Fish and Wildlife Service (2007) states that "Within these Forests (or portions thereof) that are unoccupied, we do not expect the proposed action (implementing the NRLMD) would adversely affect individual lynx as lynx are not known to be present."

Although Forest roads do not appear to affect lynx use of lynx habitat, and currently represent a negligible increased risk of lynx mortality due to the Forest being unoccupied lynx habitat, the alternatives were evaluated to determine how many miles of roads and trails would be open to motorized use within mapped lynx habitat {Project File document WILD-068.pdf}. Results for the existing condition are displayed in Table 3.5-2.

Table 3.5- 2: Miles of Roads and Trails within Identified Lynx Habitat Open to Motorized Use during All or Part of the Year on the Montana Portion of the BNF, Existing Condition

Lynx Habitat Type	Miles of Roads Open to Motorized Use	Miles of Trails Open to Motorized Use	Total Miles of Routes Open to Motorized Use
Denning Habitat	169.1	188.0	357.1
Foraging Habitat	20.1	10.3	30.4

Potential Impacts of Over-snow Vehicle Use to Lynx

There has been some concern that over-snow recreational trails into lynx habitat could affect lynx populations. Kolbe et al. (2007) conducted a study near Seeley Lake, Montana to evaluate whether snowmobile trails increased coyote predation of snowshoe hares in the winter, and thereby increased competition for prey between coyotes and lynx. They concluded that the overall influence of snowmobile trails on coyote movements and foraging success during winter appeared to be minimal on their study area, and that it was unlikely that limiting compacted snowmobile trails on their study area would significantly reduce exploitation competition between coyotes and lynx during winter (*Ibid*). Another recent study (Bunnell et al. 2006) concluded that the presence of snowmobile trails was a highly significant predictor of coyote activity in deep snow areas in Idaho, Utah, and Wyoming. Since these two papers reached different conclusions about the effects of snowmobile trails to coyote movements in the winter, there is still no conclusive evidence that, if competition exists between lynx and other predators, it exerts a population level threat to lynx.

However, the alternatives were evaluated to determine how much of the area classified as lynx habitat was open to over-snow vehicles. A geographic information system (GIS) was used to analyze the lynx habitat map overlaid with a layer showing the area open to over-snow vehicles {Project File document WILD-065.pdf}, and produced a table showing acres and percentages of lynx habitat across the Forest open and closed to over-snow vehicles {Project File document WILD-063.pdf}. Results for the existing condition are displayed in Table 3.5-3.

Table 3.5- 3: Lynx Habitat Acres Closed and Open to Over-snow Vehicles on the Montana portion of the BNF, Existing Condition

Lynx Habitat Type	Acres and (%) Closed to Over-snow Vehicles	Acres and (%) Open to Over-snow Vehicles	Total Acres Lynx Habitat
Denning Habitat	98,498 (26.3%)	276,085 (73.7%)	374,584

Lynx Habitat Type	Acres and (%) Closed to Over-snow Vehicles	Acres and (%) Open to Over-snow Vehicles	Total Acres Lynx Habitat
Foraging Habitat	9,356 (36.3%)	16,399 (63.7%)	25,755

Direct and Indirect Effects

Effects Common to All Action Alternatives

None of the action alternatives would affect the existing condition for vegetation, grazing, mineral or energy development, or highways. **All of the action alternatives** would reduce the total miles of Forest roads open to motorized use, which would improve connectivity to a minor degree. Therefore, **all of the action alternatives** would meet the NRLMD Objectives, Standards, and Guidelines for these management categories.

All of the alternatives would meet several NRLMD Objectives, Standards, and Guidelines for over-snow recreation. **None of the action alternatives** would increase the existing level of groomed and designated routes or play areas (Guideline HU G11). **None of the action alternatives** includes any new developed ski areas or expansion of any existing ski areas (Objective HU O4, Guidelines HU G1, G2, G3, G10) or any other recreation development (Objective HU O3, Guideline HU G3). **None of the action alternatives** proposes any new mineral or energy development, or affects any existing mineral or energy development (Objective HU O5, Guidelines HU G4, G5, G12).

None of the action alternatives would upgrade the maintenance level to 4 or 5 on any unpaved roads in lynx habitat (Guideline HU G6), build any new permanent roads (Guidelines HU G7, G9), or change routine maintenance along low-speed, low–traffic-volume roads (Guideline HU G8).

Summer

Motorized use of forest roads and trails outside of the snow season is not known to negatively affect lynx (USDI Fish and Wildlife Service 2007). An analysis on the Okanagon National Forest showed that lynx neither preferred nor avoided forest roads, and the existing road density did not appear to affect lynx habitat selection (McKelvey et al. 2000b). Therefore, roads and trails open to summer motorized use in any of the alternatives are expected to have negligible effects to lynx, especially given that the Forest is classified as unoccupied lynx habitat. While many of these routes would also be technically open to motorized use during the winter, it is unlikely that wheeled vehicles would use them due to snow depth.

The alternatives were evaluated using GIS to determine the number of miles of roads and trails within mapped lynx habitat that would be open to motorized vehicles some or all of the year {Project File document WILD-068.pdf}. Results for the alternatives are displayed in Table 3.5-4.

Table 3.5- 4: Miles of Roads and Trails within Mapped Lynx Habitat Open to Motorized Use during All or Part of the Year on the Montana portion of the BNF, by Alternative

	Lynx Habitat Type	Miles of Roads Open to Motorized Use	Miles Change from Existing Condition	Miles of Trails Open to Motorized Use	Miles Change from Existing Condition	Total Miles of Routes Open to Motorized Use	Miles Change from Existing Condition
Alt. 1	Denning Habitat	164.1	-5.0	110.1	-77.9	274.2	-82.9
	Foraging Habitat	19.9	-0.2	7.9	-2.4	27.8	-2.6
Alt. 2	Denning Habitat	169.1	0	188.0	0	357.1	0
	Foraging Habitat	20.1	0	10.3	0	30.4	0

	Lynx Habitat Type	Miles of Roads Open to Motorized Use	Miles Change from Existing Condition	Miles of Trails Open to Motorized Use	Miles Change from Existing Condition	Total Miles of Routes Open to Motorized Use	Miles Change from Existing Condition
Alt. 3	Denning Habitat	171.7	2.6	222.6	34.6	394.3	37.2
	Foraging Habitat	19.9	-0.2	12.3	2.0	32.2	1.8
Alt. 4	Denning Habitat	112.6	-56.5	8.5	-179.5	121.1	-236.0
	Foraging Habitat	14.3	-5.8	0.4	-9.9	14.7	-15.7

Alternative 1

Alternative 1 would prohibit wheeled motorized use on about 5.2 miles of roads and about 80.3 miles of trails within mapped lynx habitat that are currently open to motorized use year-round or seasonally. It is unclear whether additional road and trail closures during the summer would benefit lynx, since summer use of Forest roads and trails is not known to negatively affect lynx (USDI Fish and Wildlife Service 2007).

Alternative 2

Alternative 2 would not change the miles of roads and trails in mapped lynx habitat open to wheeled vehicle use. Existing impacts to lynx (if present on the Forest) and to lynx habitat from summer motorized use would continue.

Alternative 3

Alternative 3 would allow motorized wheeled use on about 2.4 miles of roads and about 36.6 miles of trails within mapped lynx habitat that are currently closed to motorized use year-round or seasonally. It is unclear whether opening additional roads and trails in lynx habitat during the summer would impact lynx, since summer use of Forest roads and trails is not known to negatively affect lynx (USDI Fish and Wildlife Service 2007).

Alternative 4

Alternative 4 would also prohibit motorized wheeled use on about 62.3 miles of roads and about 189.4 miles of trails within mapped lynx habitat that are currently open to motorized use year-round or seasonally. It is unclear whether additional road and trail closures during the summer would benefit lynx, since summer use of Forest roads and trails is not known to negatively affect lynx (USDI Fish and Wildlife Service 2007).

Over-snow

The alternatives were evaluated using GIS to determine how much of the area mapped as lynx habitat was open to over-snow vehicles {Project File documents WILD-063.pdf to 067.pdf}. Table 3.5-5 displays the amount of mapped lynx habitat on the Montana portion of the Bitterroot National Forest that is open and closed to over-snow vehicles, by alternative.

Table 3.5- 5: Mapped Lynx Habitat Acres Closed and Open to Over-snow Vehicles on the Montana portion of the Bitterroot National Forest, by Alternative

	Lynx Habitat Type	Acres and (%) Closed to Over-snow Vehicles	Acres Change from Existing Condition	Acres and (%) Open to Over-snow Vehicles	Acres Change from Existing Condition	Total Acres Lynx Habitat
Alt. 1	Denning	179,766 (48.0%)	81,268	194,818 (52.0%)	-81,267	374,584

	Lynx Habitat Type	Acres and (%) Closed to Over-snow Vehicles	Acres Change from Existing Condition	Acres and (%) Open to Over-snow Vehicles	Acres Change from Existing Condition	Total Acres Lynx Habitat
	Habitat					
	Foraging Habitat	13,122 (51.0%)	3,766	12,633 (49.0%)	-3,766	25,755
Alt. 2	Denning Habitat	98,498 (26.3)	0	276,085 (73.7)	0	374,584
	Foraging Habitat	9,356 (36.3%)	0	16,399 (63.7%)	0	25,755
Alt. 3	Denning Habitat	98,052 (26.2%)	-446	276,531 (73.8%)	446	374,584
	Foraging Habitat	9,288 (36.1%)	-68	16,467 (63.9%)	68	25,755
Alt. 4	Denning Habitat	291,257 (77.8%)	192,759	833,424 (22.3%)	-192,743	374,584
	Foraging Habitat	18,954(73.6%)	9,598	6,802 (26.4%)	-9,597	25,755

Alternative 1

Alternative 1 would further discourage the expansion of snow-compacting activities in lynx habitat (and would thus meet NRLMD Objective HU 01) by prohibiting over-snow vehicle use on about 84,944 acres of mapped lynx habitat that are currently open to such use. Most of these closures would be in recommended wilderness, the northern half of the Sapphire WSA, most of the Blue Joint WSA outside of the recommended wilderness, the Stony Mountain IRA, and in some sections of the Selway-Bitterroot IRA. Should lynx occupy the Forest in the future, these closures would benefit lynx by reducing snow compaction in lynx habitat that may allow increased prey competition from other predators, and by reducing access for trapping that could result in unintentional lynx mortality.

Alternative 2

Alternative 2 would discourage the expansion of snow-compacting activities in lynx habitat (and would thus meet NRLMD Objective HU 01) because it would not allow over-snow vehicle use to occur in any areas of mapped lynx habitat that are not currently open to such use. It would not reduce the number of acres open to over-snow vehicle use. Existing impacts to lynx (if present on the Forest) and to lynx habitat from over-snow vehicle use would continue.

Alternative 3

Alternative 3 would not discourage the expansion of snow-compacting activities in lynx habitat (Objective HU 01). It would permit over-snow vehicle access to all areas that are currently open to such use, but in addition would allow over-snow vehicle use to occur in approximately 514 acres of lynx denning habitat and 68 acres of lynx foraging habitat that are closed to such use under the existing condition. These areas of lynx habitat are in the existing Canyon Creek and Little Willow/Birch Creek Area closures, which would be abandoned under all action alternatives. While these areas provide marginal lynx habitat due to their relatively low elevations, this alternative would technically not meet NRLMD Objective HU01. Should lynx occupy the Forest in the future, this increased access would negatively impact lynx by increasing snow compaction in lynx habitat that may allow increased prey competition from other predators, and by increasing access for trapping that could result in unintentional lynx mortality.

Alternative 4

Alternative 4 would further discourage the expansion of snow-compacting activities in lynx habitat (and would thus meet NRLMD Objective HU 01) by prohibiting over-snow vehicle use in about 202,357 acres of mapped lynx habitat that are currently open to such use. Most of these closures would be in recommended wilderness areas, in the Stony Mountain, Sleeping Child and Allan Mountain IRAs, in large portions of the Selway-Bitterroot IRA, and in the Sapphire and Blue Joint WSAs. Should lynx occupy the Forest in the future, these closures would benefit lynx by reducing snow compaction in lynx habitat that may allow increased prey competition from other predators, and by reducing access for trapping that could result in unintentional lynx mortality.

Summary of Direct and Indirect Effects to Lynx

Alternative 1 would reduce the risk of summer and over-snow vehicle use impacts to lynx a considerable amount compared to **Alternatives 2 and 3**, but not as much as **Alternative 4**. **Alternative 3** would increase the risk of summer and over-snow vehicle use impacts to lynx slightly compared to **Alternative 2**. The risk of potential impacts to lynx would be much higher under **Alternative 3** than either **Alternatives 1 or 4**. **Alternative 4** would reduce the risk of summer and over-snow vehicle use impacts to lynx a considerable amount compared to **Alternatives 2 and 3**, and somewhat more than **Alternative 1**.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for lynx is the Bitterroot National Forest and adjacent high elevation areas on the Lolo, Beaverhead-Deerlodge, Salmon-Challis, and Clearwater-Nez Perce National Forests that provide lynx habitat or may be used by lynx as travel corridors. This analysis area is appropriate to analyze any incremental effects from the actions of this project on lynx in combination with past, present, and reasonably foreseeable activities because effects of implementing travel planning decisions on the Bitterroot National Forest would be negligible to lynx in more distant areas.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for lynx, which is described in the Affected Environment section, above. The impacts of management actions proposed in this EIS are analyzed in the Direct and Indirect Effects section, and are not expected to affect the quality and distribution of lynx habitat

Lynx habitat within the cumulative effects area prior to the advent of timber harvest in upper elevations was dominated by a mix of denning habitat and multi-storied mature or late-successional forests that provided some secondary foraging habitat. The lack of sapling-sized stands preferred by snowshoe hares was mostly due to the limited amount of disturbance such as large fires since the early 1900s. The lack of foraging habitat may have been a limiting factor for lynx populations in this area. Regeneration timber harvest in the 1960 to 1980s era in suitable lynx habitat on Bitterroot National Forest lands such as in Signal Creek and upper Meadow Creek, and on adjacent Forest lands converted lynx habitat within units to lynx habitat in unsuitable condition for a period of 10 to 30 years. However, as these clearcuts regenerated to conifer saplings, they became suitable habitat for snowshoe hares, and thus foraging habitat for lynx. Subsequent pre-commercial thinning in many of these units returned them to lynx habitat in unsuitable condition in the short term, although in the longer term such treatments accelerated their progress towards lynx denning habitat.

Appendix A to the FEIS describes past, ongoing, and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, may contribute to cumulative effects to lynx.

Many forest activities have little effect on lynx habitat or populations for the following reasons:

- The activity's location is not within mapped lynx habitat;
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to lynx habitat or populations:

- Invasive Plant Management
- Cattle grazing
- Personal use Christmas tree harvesting

- Special Uses/Permits (including Outfitter and Guide Activity)

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Fire Suppression

Successful fire suppression may have allowed many forested stands in the cumulative effects area to mature and become better lynx denning habitat than they might have under the influence of the historic fire regime, which would typically produce a mosaic of burned and unburned stands over time. This mosaic would have likely provided a juxtaposition of denning and foraging habitat that would have been beneficial to lynx. A number of recent large fires have begun to restore the natural mosaic of forest age classes that would have occurred naturally in this area. However, the buildup of fuels allowed by fire suppression suggests that the risk of uncharacteristically large and severe fires has increased. These types of fires could eliminate large areas of lynx denning and foraging habitat for many years.

Road and Trail Management

Access to lynx habitat via motorized and mechanized vehicles on the Bitterroot National Forest was fairly limited prior to the advent of road construction to facilitate timber harvest at higher elevations in the 1960s and 1970s. People generally reached areas that contained lynx habitat by hiking or by riding horses during the warmer months, and by snowshoes or cross-country skis during the winter. The expanding road system, combined with an increase in the availability of four-wheel drive vehicles, off-highway vehicles, and more powerful over-snow vehicles, allowed people to reach lynx habitat in increasing numbers starting around the 1960s. Improved access may have increased disturbance and/or trapping pressure on lynx during that era.

Timber Harvest, Prescribed Burning, and Associated Activities

Recent timber management activities have often focused on areas that support forests too low and dry to qualify as lynx habitat, but some harvest units have and will occur in lynx habitat. Timber harvest generally leaves stands that are too open to provide suitable foraging habitat for lynx in the short term, and reduces the quality of denning habitat as well. Therefore, timber harvest in lynx habitat is likely to add to cumulative effects to lynx in the short term. Longer term effects may be positive. Prescribed burning often reduces the amount of down woody debris as well as reducing the number of conifer seedlings and saplings in an area. Prescribed burning in lynx habitat is likely to add to cumulative effects to lynx in the short term. Burning often stimulates rapid growth of grasses, forbs and shrubs which can provide forage for snowshoe hares, and can thus be positive for lynx in the longer term. Road closures are implemented through many timber management projects to move towards meeting the elk habitat effectiveness standard. Closures of roads in lynx habitat or that lead to lynx habitat reduce the risk of human-caused disturbance and mortality to lynx, and therefore reduce cumulative effects to lynx in both the short and long terms.

Personal Use Firewood Cutting

Firewood cutting is usually concentrated along roads open to full sized vehicles year round or seasonally. Within and adjacent to these road corridors, firewood harvest can remove most of the snags that would otherwise fall and create the piles of downed woody debris that lynx often choose for den sites. Removing some of the snags along roads has a minor effect on lynx, since the majority of potential lynx denning habitat is not along open roads, and is thus not susceptible to firewood cutting.

Public Use

The potential for disturbance to lynx during the winter has increased over the last 40 years as the number of over-snow vehicle users has expanded, and machines have become more capable of reaching formerly remote lynx habitat. Over-snow vehicle access to lynx habitat on the Bitterroot National Forest has not been restricted by any recent administrative decisions. However, many recent vegetation management projects have closed Forest roads. While most of these road closures have been at elevations below typical lynx habitat, some closures have been in lynx habitat, and have reduced the risk of direct human impacts to lynx.

Reducing the number of road and trail miles or acres open to motorized vehicles would reverse some cumulative effects to lynx by reducing the potential for human disturbance or for lynx mortality due to trapping, assuming that lynx inhabit the Bitterroot National Forest. Road, trail or area motorized restrictions would generally benefit lynx populations in the longer term.

Activities on Private and State Land

Almost all private and state lands in the Bitterroot drainage are at lower elevations outside the distribution of mapped lynx habitat. Activities on these lower elevation lands pose little if any risk of impacting lynx. Exceptions include several patented mining claims along both sides of the Sapphire Divide about 3 miles east of the Chain of Lakes, and one parcel of another patented mining claim near Crystal Point at the head of a tributary of Rye Creek. Minimal mining activity occurs on these claims, but recreational cabins have been constructed on several of them. Some unquantified amount of summer and/or fall recreational use occurs on or near these mining claims in association with these cabins, which increases the risk of disturbance or poaching impacts to lynx to some extent.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to lynx by reducing over-snow and wheeled motorized access to mapped lynx habitat in parts of the Forest. This in turn would reduce the risk of human-caused mortality and disturbance to transient lynx or lynx that may occupy the Forest in the future. Cumulative effects to lynx from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to lynx because it would not change existing motorized access. All of the above listed present and reasonably foreseeable actions could have cumulative effects on lynx, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would increase the area of mapped lynx habitat open to over-snow vehicle use slightly, and would increase the miles of roads and trails in mapped lynx habitat open to wheeled vehicles. These changes in motorized access would incrementally increase cumulative effects to lynx, which is likely to be slightly negative for transient lynx or lynx that may occupy the Forest in the future. Cumulative effects to lynx from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to lynx by reducing over-snow and wheeled motorized access to mapped lynx habitat in parts of the Forest. This in turn would reduce the risk of human-caused mortality and disturbance to transient lynx or lynx that may occupy the Forest in the future. Cumulative effects to lynx from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to lynx by reducing over-snow and wheeled motorized access to mapped lynx habitat in parts of the Forest. This in turn would reduce the risk of human-caused mortality and disturbance to transient lynx or lynx that may occupy the Forest in the future. **Alternative 2** would not change the existing level of cumulative effects to lynx because it would not change existing motorized access. **Alternative 3** would increase the area of mapped lynx habitat open to over-snow vehicle use slightly, and would increase the miles of roads and trails in mapped lynx habitat open to wheeled vehicles. These changes in motorized access would incrementally increase cumulative effects to lynx, which is likely to be slightly negative for transient lynx or lynx that may occupy the Forest in the future.

Trends and Broader Context

Montana Fish, Wildlife & Parks classifies the lynx as a Montana Species of Concern. The Montana Natural Heritage Program and FWP rank the lynx as a G5 S3 species (Montana Fish, Wildlife and Parks 2015). This means that at the global scale, lynx are considered to be common, widespread, and abundant (although they may be rare in parts of their range). They are apparently not vulnerable in most of their range. At the state scale, they are considered to be potentially at risk because of limited and potentially declining numbers, extent, and/or habitat, even though they may be abundant in some areas.

McKelvey et al. (2000a) looked at the historical distribution of lynx from the 1880s to the present. For Montana, they found evidence of lynx from museum specimens collected between 1887 and 1921 (three from the Bitterroot Mountains), and reliable trapping data obtained from the FWP beginning in 1950. These data show continuous presence of lynx in Montana since that time, based on over 475 lynx harvested by trappers. Lynx harvest data from Montana is cyclical in nature, with peaks corresponding closely in time and magnitude with those occurring in western Canada, especially for 1963 and 1971. Schwartz et al (2002) analyzed lynx genetic markers, and found strong support for the hypothesis that high levels of gene flow in lynx populations are the result of long distance dispersals that occur immediately after the peak of the lynx cycle in the center of their range. This implies that lynx populations in Montana may be at least partially sustained by animals dispersing from Canada during peak years.

Montana Fish, Wildlife & Parks closed the lynx trapping season in Montana when lynx were listed as a threatened species. Currently there is no legal lynx trapping in Montana, although lynx may occasionally still be caught in traps targeting other species.

Effects Determination

See the biological evaluation/assessment Summary (Section 3.5.8) for documentation of the effects determinations for lynx under these alternatives. See also the Biological Assessment for lynx {Project File document WILD-171.pdf} and USFWS Letter of Concurrence {Project File document WILD-172.pdf}

Alternatives 1, 2 and 4 meet the applicable NRLMD objectives, standards, and guidelines, so they would not increase adverse effects to lynx populations or habitat, or reduce the potential for lynx habitat on the Bitterroot National Forest to support lynx. **Alternative 3** meets most of the applicable NRLMD Objectives, Standards, and Guidelines. However, it permits some expansion of snow-compacting activities, so does not comply with Objective HU 01. This would result in a minor increase in adverse effects to lynx populations if they should occupy the Forest, and would reduce the potential for lynx habitat on the Bitterroot National Forest to support lynx.

Alternative 1

Alternative 1 would not affect the vegetative component of existing lynx habitat. It would discourage the expansion of snow-compacting activities in lynx habitat by prohibiting over-snow vehicle use on about 84,944 acres of mapped lynx habitat that are currently open to such use. **Alternative 1** would also prohibit motorized wheeled use on about 5.2 miles of roads and about 80.3 miles of trails within mapped lynx habitat that are currently open to motorized use year-round or seasonally. These changes in travel management would reduce cumulative effects to lynx, which is likely to be positive for transient lynx or lynx that may occupy the Forest in the future. However, this alternative would continue to allow motorized use in large portions of mapped lynx habitat on the Forest. The potential effects of continued motorized use to lynx are either discountable or insignificant. As a result, the effects determination for lynx for **Alternative 1** is May Affect, Not Likely to Adversely Affect. See the Biological Assessment for lynx {Project File document WILD-171.pdf} for documentation of the information and rationale supporting this effects determination.

Alternative 2

Implementation of **Alternative 2** would have No Effect on lynx or their habitat since it would not change existing motorized access to lynx habitat. Cumulative impacts resulting from previous management actions would continue.

Alternative 3

Alternative 3 would not affect the vegetative component of existing lynx habitat. It would not discourage the expansion of snow-compacting activities in mapped lynx habitat because it would permit over-snow vehicle access to all areas that are currently open to such use. In addition, it would allow over-snow vehicle use to occur in approximately 514 acres of lynx denning habitat and 68 acres of lynx foraging habitat that are closed to such use under the existing condition. **Alternative 3** would also allow motorized wheeled use on about 2.4 miles of roads and about 36.6 miles of trails within mapped lynx habitat that are currently closed to motorized use year-round or seasonally. These changes in travel management would incrementally increase cumulative effects to lynx, which is likely to be slightly negative for transient lynx or lynx that may occupy the Forest in the future. The potential effects of slightly-increased motorized use to lynx are either discountable or insignificant. As a result, the effects determination for lynx for **Alternative 3** is May Affect, Not Likely to Adversely Affect.

Alternative 4

Alternative 4 would not affect the vegetative component of existing lynx habitat. It would discourage the expansion of snow-compacting activities in lynx habitat by prohibiting over-snow vehicle use on about 202,357 acres of mapped lynx habitat that are currently open to such use. **Alternative 4** would also prohibit motorized wheeled use on about 62.3 miles of roads and about 189.4 miles of trails within mapped lynx habitat that are currently open to motorized use year-round or seasonally. These changes in travel management would reduce cumulative effects to lynx, which is likely to be positive for transient lynx or lynx that may occupy the Forest in the future. However, this alternative would continue to allow motorized use in some portions of lynx habitat on the Forest. The potential effects of continued motorized use to lynx are either discountable or insignificant. As a result, the effects determination for lynx for **Alternative 4** is May Affect, Not Likely to Adversely Affect. See the Biological Assessment for lynx {Project File document WILD-171.pdf} for documentation of the information and rationale supporting this effects determination.

B. Yellow-billed Cuckoo (*Coccyzus americanus*) (Western population) (Threatened)

Legal Status

On October 3, 2014 the United States Fish and Wildlife Service (USFWS) issued a rule to list the western population of the yellow-billed cuckoo as a threatened species under the Endangered Species Act (USDI Fish and Wildlife Service 2014c). On October 7, 2014 the USFWS issued an updated species list of threatened, endangered and candidate species that may be present on the BNF {Project File document WILD-051.pdf displays the latest update of the list}. The October 7, 2014 update of the species list added the western population of the yellow-billed cuckoo as a species that may be present on the BNF in riparian habitats with cottonwoods and willows (*Ibid*). Prior to that update, the western yellow-billed cuckoo was included on the USFWS list for the BNF as a proposed species. Critical habitat has not been designated for this species, but the proposed rule for designating critical habitat does not include any areas in Montana (USDI Fish and Wildlife Service 2014b).

Affected Environment

Suitable habitat for yellow-billed cuckoos (riparian woodlands dominated by cottonwoods with dense understories of willows and other shrubs) exists in some areas within the Bitterroot River floodplain, mostly on private land. Potentially suitable habitat within the BNF is limited to the riparian zones along a few of the larger streams. Few if any of these relatively narrow habitat stingers provides sufficient habitat to support a nesting pair of cuckoos, which require 25 to 50 acres of suitable habitat. Existing routes along the lower elevation large streams where patches of potentially suitable cuckoo habitat occur on the BNF are main roads that are open to year-long motorized use.

The Montana Natural Heritage Program database lists three records of yellow-billed cuckoos in Ravalli County {Project File document WILD-188.pdf}. The first was a bird found dead on a sidewalk in Hamilton in June 1961. The second was a bird found dead after striking a window in a house on Middle Burnt Fork Road about seven miles east of Stevensville in June 1988. The third was a sighting of a cuckoo along the Burnt Fork several miles east of Stevensville in July 1997. No other cuckoos have been reported in Ravalli County despite years of weekly monitoring effort during the breeding season at several bird banding stations and many bird surveys within cuckoo habitat along the Bitterroot River. This lack of detections indicates that it is unlikely that a population of cuckoos is established in Ravalli County, and that the three existing records probably represent non-breeding adult vagrants.

Effects Determination

The effects determination for yellow-billed cuckoo is No Effect for all alternatives. This call is based on the lack of evidence that the species occurs in the Bitterroot drainage, the very limited amount of suitable habitat on BNF lands, and the fact that none of the alternatives would change existing routes open to motorized use within suitable cuckoo habitat.

C. Gray Wolf (*Canis lupus*) (Sensitive)

Legal Status

The legal status of gray wolves has changed several times since the Travel Planning Management Project began.

Reinstatement of 2009 Delisting

On April 15, 2011, the 2011 Appropriations Act that was signed by the President included the following language: "Before the end of the 60-day period beginning on the date of enactment of this division, the Secretary of the Interior shall reissue the final rule published on April 2, 2009 (74 Fed. Reg. 15123 et seq) without regard to any other provision of statute or regulation that applies to issuance of such rule. Such reissuance (including this section) shall not be subject to judicial review and shall not abrogate or otherwise have any effect on the Order and Judgment issued by the United States District Court for the District of Wyoming in Case Numbers 09-CV-118J and 09-CV-138J on November 18, 2010."

As a result of this legislation, USFWS reissued the 2009 wolf delisting rule on May 5, 2011 {Project File document WILD-069.pdf}. Wolves in Montana and Idaho are no longer listed as Endangered, and wolf management has been returned to the state wildlife management agencies. According to the provisions of the 2011 Appropriations Act, this reissuance is not subject to judicial review. Wolves were automatically added to the Regional Forester's Sensitive species list at the time they were delisted.

Effects Analysis Methods

For each alternative the following evaluation criterion were used to predict impacts to gray wolf:

- Prey availability
- Human disturbance as predicted by miles of roads and trails open to motorized use, and the percentage of the Forest classified as Wildlife Core Security Area (percentage of an area classified as security area during the summer)

None of the activities proposed would make habitat unsuitable for wolves; therefore, habitat quality is not an evaluation criteria

Affected Environment

Wolves are classified as a habitat generalist. The entire Bitterroot National Forest is currently suitable habitat for wolves from the standpoint of the vegetation. At least 16 wolf packs were known or suspected to use portions of the Forest at the end of 2013. Thirteen of these packs were classified as Montana packs, while three of them were classified as Idaho packs (Bradley et al. 2014, USDI Fish and Wildlife Service et al. 2014).

There is some evidence to suggest that gray wolves may have occurred as transient individuals on the Forest in the decade prior to the U.S. Fish and Wildlife Service's reintroduction efforts near the Salmon River (see Cumulative Effects section) in January 1995. Reports of wolf tracks, scat, howling, and wolf sightings have become fairly common across the Forest since that time.

The Bitterroot National Forest is within the boundaries of the Central Idaho Recovery Area (CIRA) for gray wolves. The CIRA includes all of Idaho south of I-90 and north of I-84 and I-86 and west of I-15, and all of western Montana south of I-90 and west of I-15. Until the recent delisting direction, any wolves within this area were classified as part of an experimental, non-essential population, and were treated as a proposed species under Section 10 (j) of the Endangered Species Act.

Known wolf range and numbers within the BNF in 2013 were similar to 2012. 16 wolf packs were known or suspected to use portions of the Forest in 2013. Three new wolf packs (Ambrose, Burnt Fork and Overwhich) were documented using the Montana portion of the Forest in 2013, while two Montana packs extant in 2012 were thought to have been removed through legal harvest in 2013 (Painted Rocks and Shook Mountain) (Bradley et al. 2014).

Montana Fish, Wildlife & Parks implemented wolf hunting seasons beginning in 2009, and added a wolf trapping season in 2012 in an effort to reduce wolf numbers in Montana. Twenty wolves were legally harvested in Ravalli County in 2013, 10 by hunters and 10 by trappers. The miles of roads and trails currently open to motorized use can be found in Chapter 2, Table 2-21. The methodology used to determine wildlife core security area is discussed in the

Elk section (Chapter 3.5.6 (H), Wildlife Core Security Area subsection). Existing Wildlife Core Security Area acres and percentages can be found in Chapter 3.5, Table 3.5-35.

Direct and Indirect Effects

Summer

Alternative 1

Alternative 1 would reduce the total miles of roads open to motorized use yearlong by about 41 miles, and the length of roads open to motorized use seasonally by about 9 miles (Chapter 2, Table 2-20). **Alternative 1** would reduce the length of two-track trails open to motorized use yearlong by about 74 miles, but would increase the length of two-track trails open to motorized use seasonally by about 9 miles. **Alternative 1** would reduce the length of single-track trails open to motorcycle use yearlong by about 246 miles, but would increase the length of single-track trails open to motorcycle use seasonally by about 43 miles (*Ibid*).

The percentage of the Forest classified as Wildlife Core Security Area would increase from 45.6 percent to 52.8 percent during the summer (Chapter 3.5.6 I, Table 3.5-44). Most of this increase in area outside the motorized footprint would be located in recommended wilderness areas, the Sapphire Wilderness Study Area, and the Stony Mountain, Reimel-Tolan and Allan Mountain IRAs {Project File document WILD-145.pdf}. Reducing motorized access would reduce the risk of disturbance and mortality to wolves from human activities. In addition, reducing human access and associated disturbance to big game animals would benefit wolves by reducing hunting and poaching mortality of wolf prey species. Seasonal restrictions on motorized use would hopefully result in big game species (especially elk) staying on summer ranges longer, which would in turn tend to keep wolves in more remote areas for longer periods of the year where they would be less likely to come in contact with livestock and people. This alternative would not affect habitat suitability for wolves, which are a wide-ranging habitat generalist. The net effect from this combination of factors to local wolf populations is expected to be moderately positive.

Alternative 2 (No Action)

Alternative 2 would not affect gray wolf habitat or populations in the short term. This alternative would not affect the availability of prey items for wolves because it would not change existing habitat conditions or the potential for human disturbance to big game. It would not change the potential for human disturbance to wolves because it would not affect existing open route densities.

Alternative 3

Alternative 3 would reduce the total miles of roads open to motorized use yearlong by about 14 miles, but would increase the length of roads open to motorized use seasonally by about 8 miles (Chapter 2, Table 2-21). **Alternative 3** would reduce the length of two-track trails open to motorized use yearlong by about 38 miles, but would increase the length of two-track trails open to motorized use seasonally by about 47 miles (*Ibid*). **Alternative 3** would reduce the total miles of single-track trails open to motorcycles yearlong by about 40 miles, but would increase the length of single-track trails open to motorcycles seasonally by about 109 miles (*Ibid*).

The percentage of the Forest classified as wildlife core security area would decrease from 45.6 percent to 43.7 percent during the summer (Chapter 3.5.6 I, Table 3.5-44). The decline in area outside the motorized footprint would be spread out between all of the Hunting Districts (HDs) on the Forest, but would be focused in some of the recommended additions to the Selway-Bitterroot Wilderness Area that are currently closed to motorized use and the northern part of the Sapphire Wilderness Study Area {Project File document WILD-146.pdf}.

Increasing motorized access would increase the risk of disturbance and mortality to wolves from human activities to some degree. In addition, increasing human access and associated disturbance to big game animals could be detrimental to wolves by increasing hunting and poaching mortality of wolf prey species. Increased motorized access could result in big game species (especially elk) leaving summer ranges for more secure winter ranges earlier, which would in turn tend to draw wolves to less remote areas for longer periods of the year where they would be more likely to come in contact with livestock and people. This alternative would not affect habitat suitability for wolves, which are a wide-ranging habitat generalist. The net effect from this combination of factors to local wolf populations is expected to be slightly negative.

Alternative 4

Alternative 4 would reduce the total miles of roads open to motorized use yearlong by about 312 miles, and the length of roads open to motorized use seasonally by about 140 miles (Chapter 2, Table 2-21). **Alternative 4** would reduce the length of two-track trails open to motorized use yearlong by about 100 miles, and the length of two-track trails open to motorized use seasonally by about 434 miles (*Ibid*). **Alternative 4** would reduce the length of single-track trails open to motorcycle use yearlong by about 324 miles, and the length of single-track trails open to motorcycle use seasonally by about 68 miles (*Ibid*).

The percentage of the Forest classified as Wildlife Core Security Area would increase from 45.6 percent to 69.6 percent during the summer (Chapter 3.5, Table 3.5-44). Most of this increase in area outside the motorized footprint would be located in recommended wilderness areas, the Sapphire and Blue Joint Wilderness Study Areas, and all of the IRAs across the Forest {Project File document WILD-147.pdf}.

Reducing motorized access in all these remote areas would reduce the risk of disturbance and mortality to wolves from human activities. In addition, reducing human access and associated disturbance to big game animals would benefit wolves by reducing hunting and poaching mortality of wolf prey species. Seasonal restrictions on motorized use could potentially result in big game species (especially elk) staying on summer ranges longer, which would in turn tend to keep wolves in more remote areas for longer periods of the year where they would be less likely to come in contact with livestock and people. This alternative would not affect habitat suitability for wolves, which are a wide-ranging habitat generalist. The net effect from this combination of factors to local wolf populations is expected to be strongly positive.

Over-snow

Wolves prey mainly on large, wild ungulates such as elk, deer, and moose. Wolves need to move to areas where their prey animals occur at high enough densities to provide a reasonable chance of finding and killing vulnerable animals often enough to keep the pack fed. Since most elk and deer spend winters on low-elevation winter ranges where snow pack is limited, wolves in the winter also tend to be located in these areas. Winter ranges typically receive little public over-snow vehicle use; either because they are on private land, have little snow cover, or are within existing area closures. Most over-snow vehicle use occurs at higher elevations with considerable snow packs. Since few large ungulates are present in these higher elevations during the winter (with the exception of the occasional moose), wolves are usually absent as well. Over-snow vehicle use in most areas thus has little potential to affect wolves. One known exception on the Forest is in the Tepee Creek area on the Sula Ranger District. Even though this area receives a considerable amount of snow, large numbers of elk often winter there. The presence of large numbers of prey animals attracts wolves. The area is currently closed to full-sized vehicles year round and to ATVs and over-snow vehicles during the hunting season. It is open to ATV and over-snow vehicle use during the rest of the winter, creating potential for conflict with wolves, and increasing the mortality risk to wolves from poaching.

Effects Common to All Action Alternatives

Alternatives 1, 3 and 4 would eliminate one existing winter range area closure in the headwaters of Little Willow Creek and Birch Creek. This area may support some wintering elk or mule deer, and wolves may hunt in the area to some extent. The terrain in the Little Willow Creek-Birch Creek area closure is suitable for over-snow vehicles, although the area may not typically support enough snowpack to be highly attractive for such use. Eliminating this closure may result in some additional potential for people on over-snow vehicles to poach or harass wolves; however, the potential for additional effects to wolves is limited.

Alternative 1

Alternative 1 would allow over-snow vehicle use on approximately 46.4 percent of the Montana portion of the Forest (522,592 acres) throughout the winter, and on approximately 3.7 percent of the Montana portion of the Forest (41,856 acres) seasonally (generally after the rifle season) {Project File document WILD-071.pdf}. In addition to eliminating the Little Willow Creek-Birch Creek winter range area closure, it would also eliminate the existing Romney Ridge winter range area closure on the south face of Canyon Creek canyon between the Forest boundary and the Selway-Bitterroot Wilderness boundary. Eliminating this winter closure would have little effect on wolves because the Canyon Creek road is currently open to over-snow vehicle use on the edge of the existing closure, and there is little suitable terrain for over-snow vehicle use off of the road, except up the Canyon Creek trail. Over-snow vehicle use may increase somewhat in this area.

Alternative 1 would prohibit over-snow vehicle use in the Tepee Creek winter range during the winter to reduce disturbance to elk that winter in this area. Wolves frequently use this area while hunting for wintering elk. This restriction on over-snow vehicle use would benefit wolves by reducing the risk of poaching or harassment from people riding these machines in this area.

In addition, **Alternative 1** would prohibit over-snow vehicle use in the northern portion of the Stony Mountain IRA, the northern half of the Sapphire WSA, the Blue Joint Recommended Wilderness, and most of the rest of the Blue Joint WSA outside of the Recommended Wilderness (See Alternative 1 Winter Map on CD). **Alternative 1** would also prohibit over-snow vehicle access to all of the recommended additions to the Selway-Bitterroot Wilderness Area, and to large portions of the Selway-Bitterroot IRA that are adjacent to the Selway-Bitterroot Wilderness. These areas are generally too high or steep to support much winter big game use, so wolf use within them in winter is probably limited. Restricting over-snow vehicle use in these areas would benefit wolves, but only to a small degree.

Alternative 2

Alternative 2 would continue the existing condition for over-snow vehicle access across the Forest. Currently, over-snow vehicle use is allowed on approximately 62.1 percent of the Montana portion of the Forest (699,884 acres) throughout the winter, and on approximately 4.4 percent of the Montana portion of the Forest (49,097 acres) seasonally (generally after the rifle season) {Project File document WILD-071.pdf}. Wolves in the Tepee Creek winter range would continue to be vulnerable to poaching or harassment from people on over-snow vehicles. Existing over-snow vehicle use in recommended wilderness and the Stony Mountain IRA would continue, although this use has little potential for effects to wolves that follow big game herds down to winter ranges.

Alternative 3

Alternative 3 would allow over-snow vehicle use on approximately 62.5 percent of the Montana portion of the Forest (704,553 acres) throughout the winter, and on approximately 4.4 percent of the Montana portion of the Forest (49,097 acres) seasonally (generally after the rifle season) {Project File document WILD-071.pdf}. **Alternative 3** would allow over-snow vehicle use to continue in all areas of the Forest where it is currently permitted, and would increase the acreage open to such use by eliminating the existing winter range area closures in the Little Willow Creek-Birch Creek and Canyon Creek areas as described under the Effects Common to All Action Alternatives section and in **Alternative 1**. (See Alternative 3 Winter Map on CD). Since these two winter range areas provide marginal over-snow vehicle opportunities most winters, the overall effect of these changes to wolves is expected to be minimal.

Alternative 4

Alternative 4 would allow over-snow vehicle use on approximately 28.3 percent of the Montana portion of the Forest (318,582 acres) throughout the winter, and on approximately 3.7 percent of the Montana portion of the Forest (41,856 acres) seasonally (generally after the rifle season) {Project File document WILD-071.pdf}. It would eliminate the existing winter range area closure in the Little Willow Creek-Birch Creek area as described under the Effects Common to All Action Alternatives section. However, it would retain the Romney Ridge winter range area closure since it is within the Selway-Bitterroot IRA. **Alternative 4** would prohibit over-snow vehicle use in the Tepee Creek winter range during the winter to reduce disturbance to elk that winter in this area. Wolves frequently use this area while hunting for wintering elk. This restriction on over-snow vehicle use would benefit wolves by reducing the risk of poaching or harassment from people riding these vehicles in this area.

Alternative 4 would also prohibit over-snow vehicle access to the Sapphire crest in the Stony Mountain IRA and the Sapphire WSA, the Blue Joint WSA as well as the Blue Joint Recommend Wilderness, all of the recommended additions to the Selway-Bitterroot Wilderness Area, and in all of the IRAs across the Forest, including the Selway-Bitterroot IRA adjacent to the Selway-Bitterroot Wilderness Areas, and the Sleeping Child, Allan Mountain, and Reimel-Tolan IRAs. (See Alternative 4 Winter Map on CD). Most of these areas are too high or steep to support much winter big game use, so wolf use within them in winter is probably limited. Restricting over-snow vehicle use in these areas would benefit wolves, but only to a small degree. Lower elevations near the east side of the Blue Joint WSA do provide some big game winter range, so wolves may use those areas in the winter. Prohibiting over-snow vehicle use in these areas would reduce the risk of poaching or harassment of wolves, and would thus be beneficial to wolves.

Summary of Direct and Indirect Effects to Gray Wolves

Alternative 1 would reduce the risk of motorized human-caused disturbance or mortality to wolves, and enhance availability of prey more than **Alternatives 2 and 3**, but less than **Alternative 4**. **Alternative 3** would increase the risk of motorized disturbance or mortality to wolves, and decrease the availability of prey somewhat compared to **Alternative 2**, and substantially compared to **Alternatives 1 and 4**. **Alternative 4** would reduce the risk of human-caused disturbance or mortality to wolves, and enhance availability of prey substantially more than **Alternatives 2 and 3**, and somewhat more than **Alternative 1**.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for wolves is the Bitterroot River drainage and adjacent drainages used by wolf packs that spend most of their time in the Bitterroot drainage. This analysis area is appropriate to analyze any incremental effects from the actions of this project on wolves in combination with past, present, and reasonably foreseeable activities because the effects of implementing travel management planning decisions on the Bitterroot National Forest are negligible for wolves in more distant areas. Since the Bitterroot National Forest is within the Central Idaho Recovery Area (CIRA), and wolves throughout the CIRA are likely part of a larger subpopulation, an assessment of information available at the broader CIRA level is also considered to provide additional context.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for gray wolves, which is described in the Affected Environment section, above.

Wolves were not present on the Bitterroot National Forest or adjacent areas during previous periods of extensive road construction and timber harvest, so those past activities had no direct or indirect effects on wolves.

The impacts of management activities proposed in this FEIS are analyzed in the Direct and Indirect Effects section, and are expected to have no measureable impact to the quality and distribution of wolf habitat.

Appendix A to the FEIS describes past, present and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, may contribute to cumulative effects to wolves.

Many forest activities have little effect on wolf populations, because:

- The activity does not alter the suitability of the habitat for wolves, which are a habitat generalist;
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to wolf populations include:

- Fire suppression
- Invasive Plants Management
- Personal Use firewood cutting
- Personal use Christmas tree harvesting
- Most Special Uses/Permits (excluding Outfitter and Guide Activity)

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project. These activities typically involve access management activities that affect the risk of human-caused disturbance or mortality to wolves, or vegetative management activities that alter habitat conditions for wolf prey animals including deer, elk and moose.

Road and Trail Management

Improved hunting access to many areas of the Bitterroot National Forest and adjacent National Forests, state, and private lands on the road system constructed primarily for access to timber harvest units resulted in declines in elk populations in the 1960s and 1970s. However, elk populations had rebounded by the time wolves reoccupied the Bitterroot National Forest, due to a combination of road closures, reforestation that increased hiding cover and security areas, and FWP harvest regulations that promoted larger herd numbers. Many vegetation management projects have closed Forest roads since wolves reappeared on the Forest in the 1990s, which has reduced the risk of human-caused mortality and disturbance to wolves. Increased use of OHVs on trails during this period, however, has increased the risk of human impacts to wolves. The fact that wolves have reoccupied the area recently and are reproducing successfully indicates that the area is providing adequate habitat and prey to support a robust wolf population.

Cattle Grazing

There are 16 active and four inactive grazing allotments on the Bitterroot National Forest. Cattle on these allotments may be vulnerable to predation by wolves. Wolf packs that prey on domestic livestock are subject to lethal control by federal and state agencies. The presence of domestic livestock on the Bitterroot National Forest and adjacent federal, state, and private lands increases the risk of wolves preying on livestock, which in turn increases the risk of lethal control actions that reduce the number of wolves in the area. Most wolf predation on livestock and resulting lethal control actions occur on private lands.

Public Use

Public use of federal, state, and private lands in the area for the purposes of hunting or trapping wolves during legal seasons can result in increased wolf mortality and disruption of wolf social structure. Wolf numbers in the area will likely decline as a result. Other forms of public use are unlikely to result in reduced wolf numbers, although they could cause minor, temporary disturbance to wolves.

Outfitter and Guide Special Use Permits

Outfitters and guides operating under Special Use Permits increase the risk of human-caused mortality to wolves by taking hunters to remote locations they may not be capable of reaching on their own, and by providing advice on hunting or trapping wolves. This activity is likely to result in increased wolf mortality and disruption of wolf social structure.

Activities on Private and State Land

State lands in the Bitterroot drainage are managed in ways similar to Bitterroot National Forest System lands, although public access may be more restricted at certain times of year to reduce impacts to wildlife, soils, watersheds, and road surfaces. Reduced public access may result in reduced risk of impacts to wolves compared to federal lands.

Most livestock grazing in the Bitterroot drainage occurs on private lands. Livestock on remote pastures on private land are vulnerable to wolf predation, especially if elk are present in the area. Wolf predation on livestock grazing on private land results in most of the lethal control actions that reduce wolf numbers. Other wolf mortalities may occur as the result of wolves approaching residences or attacking domestic dogs.

Timber Harvest, Prescribed Burning, and Associated Activities

A number of ongoing or reasonably foreseeable vegetative management projects may impact wolves to some extent by reducing elk hiding cover and/or by reducing the miles of roads open to motorized access. These include the Trapper Bunkhouse project in the area from Trapper Creek to Tin Cup Creek on the Darby District, the Lower West Fork project on the northern part of the West Fork District, the Como Forest Health Protection project on the Darby District, and the Three Saddle Vegetation Management Project on the Stevensville District. Most of these projects include prescribed burning as well as timber harvesting. These projects may have some impact to elk numbers due to habitat changes and/or reductions in hunter access. Possible impacts to wolves could result from changes in elk numbers or from reductions in motorized access that could limit human-caused mortality and disturbance.

Legal hunting and trapping seasons for wolves are likely to have a much larger impact on wolf numbers, distribution, and dispersal on the Forest and across western Montana and Idaho than any vegetation and travel management projects. Changes to wolf populations resulting from such projects would be difficult to quantify, but are expected to be minor in relation to population changes caused by hunting and trapping.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce the cumulative effects to wolves by reducing motorized access to parts of the Forest. This in turn would reduce the risk of human-caused mortality and disturbance to wolves, and to their ungulate prey base. Cumulative effects to wolves from the above listed present and reasonably foreseeable actions would likely continue.

However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to wolves because it would not change existing motorized access. All of the above listed present and reasonably foreseeable actions could have cumulative effects on wolves, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would reduce the miles of roads open to motorized use slightly, while increasing the miles of trails in remote areas open to motorized use. On balance, this alternative would increase cumulative effects to wolves to some extent. Cumulative effects to wolves from all of the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly- increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to wolves by reducing motorized access to many backcountry areas of the Forest. This in turn would reduce the risk of human-caused mortality and disturbance to wolves, and to their ungulate prey base. Cumulative effects to wolves from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to wolves by reducing motorized access to parts of the Forest. This in turn would reduce the risk of human-caused mortality and disturbance to wolves, and to their ungulate prey base. **Alternative 2** would not change the existing level of cumulative effects to wolves because it would not change existing motorized access. **Alternative 3** would reduce the miles of roads open to motorized use slightly, while increasing the miles of trails in remote areas open to motorized use. On balance, this alternative would increase cumulative effects to wolves to some extent.

Trends and Broader Context

The Montana Natural Heritage Program and FWP rank the gray wolf as a G4 S4 species (Montana FWP 2015). This means that at the global scale, wolves are considered to be uncommon but not rare (although they may be rare in parts of their range), and usually widespread. They are apparently not vulnerable in most of their range, but there is possibly cause for long-term concern. At the state scale, they are considered to be apparently secure, though they may be quite rare in parts of their range, and/or suspected to be declining.

Wolves were not present on the Forest during much of the past period of management activities. Statewide bounties were placed on gray wolves from 1883 to 1915 with approximately 80,730 wolves killed during that period. Wolves were eventually extirpated from Montana, with the last known wolf shot in Lincoln in 1961. Naturally-dispersing wolves from Canada first denned along the west side of Glacier National Park in 1986, and wolves became established throughout much of northwest Montana in the following decade. Wolves were reintroduced into central Idaho and Yellowstone National Park in 1995 and 1996, respectively, and populations in southern Idaho and southwestern Montana have increased and expanded their ranges dramatically since then. Most wolves on the Bitterroot National Forest are probably descendants of wolves released in central Idaho.

Wolf monitoring efforts conducted by the Montana Department of Fish, Wildlife and Parks, the Idaho Department of Fish and Game, and the Nez Perce Tribe documented a total of 113 wolf packs in the Central Idaho Recovery Area (CIRA) that includes the BNF at the end of 2013, an increase of 11 packs over the total in 2009 (USDI Fish and Wildlife Service et al. 2014). 87 of these packs were in the Idaho portion of the CIRA, and 26 were in the Montana portion of the CIRA. Estimated wolf numbers within the CIRA decreased from about 913 in 2009 to 673 in 2013. This decrease in estimated numbers was likely due to increased wolf mortality from legal wolf hunting and trapping in Montana and Idaho, combined with a lack of information caused by a reduction in the intensity of wolf monitoring efforts. This population data indicates that wolves occupy a similar amount of habitat as in 2009, but that the average known pack size has declined. Reproduction was confirmed in 57 packs within the CIRA, 23 of which met the recovery standards for a breeding pair. These packs produced a minimum of 136 pups in Idaho in 2013. There was no estimate of the number of pups produced in Montana. 404 wolves were confirmed to have died in 2013 within the CIRA, including at least 399 due to human-related causes. 282 of the human-caused mortalities were legal harvest during wolf hunting and trapping seasons (*Ibid*).

Effects Determination

Gray wolves were removed from Federal listing on May 27, 2011, and immediately added to the Regional Forester's Sensitive Species List. See the Biological Evaluation/Assessment Summary (Section 3.5.8) for documentation of the effects determinations for gray wolves under these alternatives.

Alternative 1

Alternative 1 reduces motorized access to wolf habitat in remote areas to some extent, and therefore reduces cumulative effects to wolves. It is likely that reducing human access to these areas would be positive for wolves, but this alternative would continue to allow motorized use in large portions of wolf habitat on the Forest. As a result, the effects call for Alternative 1 is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 2

Implementation of **Alternative 2** would have No Impact on wolves or their habitat since it would not change existing motorized access to wolf habitat. Cumulative impacts resulting from previous management actions would continue

Alternative 3

Alternative 3 would increase motorized access to wolf habitat in some remote areas, and therefore increases cumulative effects to wolves to some extent. It is likely that increasing human access to these areas would be somewhat negative for wolves, but the overall impact to wolf populations across the Forest or at larger scales would probably be minor. As a result, the effects call for **Alternative 3** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 4

Alternative 4 would reduce motorized access to wolf habitat in many remote areas, and therefore reduces cumulative effects to wolves. It is likely that reducing human access to these areas would be positive for wolves, but this alternative would continue to allow motorized use in large portions of wolf habitat on the Forest. As a result, the effects call for **Alternative 4** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

D. Bald Eagle (*Haliaeetus leucocephalus*) (Sensitive)

Legal Status

Bald eagles were removed from Federal listing as a threatened species by USFWS on August 8, 2007 {Project File document WILD-011.pdf}. Per Region 1 policy, the bald eagle was automatically added to the Regional Forester's Sensitive Species List when it was removed from Federal listing {Project File document WILD-012.pdf}.

Effects Analysis Methods

The analysis of potential impacts to bald eagles evaluates the potential for temporary disturbance to one known nest located on Bitterroot National Forest lands. All other known bald eagle nests in the Bitterroot drainage are on private land, and would not be affected by travel management actions proposed in this FEIS.

Affected Environment

Bald eagle nesting or roosting habitat typically includes mature to over-mature mixed conifer, ponderosa pine, and cottonwood stands near large rivers or lakes. A total of 27 bald eagle territories have been identified in the Bitterroot drainage since 1990. At least 18 of these territories were known to be active in 2013, and fledged at least 25 young. All of the nests within these territories are on private land near the Bitterroot River or its East and West Forks, with the exception of one nest on Bitterroot National Forest lands near Lake Como. None of the travel management proposals would affect any of the nests on private land.

The Lake Como nest has been active almost every year since it was discovered in 2003. It has successfully fledged either one or two young every year since then except for 2010, when the nest apparently failed, and 2012, when the nest was not active. The nest fledged one known young in 2013, and one young in 2014.

The Montana Bald Eagle Management Plan (USDI Bureau of Reclamation 1994) contains objectives and guidelines for management activities within concentric nest site management zones around bald eagle nests. Zone I is the Nest Site Area, and includes the area within ¼ mile of active nests. Zone II is the Primary Use Area, and includes the area between ¼ and ½ mile of active nests. Zone III is the Home Range Area, and includes the area within 2.5 miles of active nests. The objectives for Zones I and II include eliminating or minimizing disturbance during the nesting season, which in this area typically runs from about mid-February until mid-July. Guidelines for Zone I state that existing levels of human activities can continue if the breeding area has at least a 60% nest success rate, has fledged at least 3 young over the last 5 years, and has a low potential hazard rating. Low intensity activities such as dispersed recreation can occur. Zone II guidelines are less restrictive, and Zone III guidelines contain few limitations on activities outside key areas.

Zone I around the Lake Como nest contains portions of nonmotorized trail #580 along the lake shore and portions of motorized trail on an existing road prism (Road #550 west of its junction with Road .#13200) that is currently open to OHV use year-long. Zone II around the Lake Como nest contains portions of several other roads that are open to motorized use either seasonally or year-round. Most of the roads in Zone II to the south of the Lake Como nest are closed to over-snow vehicle use during the winter because they are part of the Lake Como cross-country ski area. The designated cross-country ski trails are groomed periodically using a snowmobile. Motorized boat use of the lake becomes quite heavy starting Memorial Day weekend, and Zones I and II both contain portions of the lake frequented by motor boats and jet skis. The bald eagle pair nesting at Lake Como is apparently at least somewhat habituated to the existing level of disturbance on the lake, as they have successfully fledged young almost every year since they established this territory.

Direct and Indirect Effects

The Lake Como nest exceeds the minimum nest success and productivity requirements contained in the Montana Bald Eagle Management Plan (USDI Bureau of Reclamation 1994) for Zone I, and meets the guidelines in the Plan for all three Zones. Therefore, these existing uses can continue under Plan guidelines. Some of these uses may disturb eagles using the Lake Como nest to some extent, but the continued success of this nest shows that the eagles can tolerate the existing levels of use.

Effects Common to All Action Alternatives

All of the alternatives, including **Alternative 2** (No Action) would continue the existing nonmotorized use on Trail #580 within the Nest Site Area (Zone I) around the Lake Como nest. **All of the alternatives** would continue existing uses on roads within Zone II, but these are on the opposite side of a ridge from the nest, and the dispersed recreational activities on them cause little or no disturbance to the nest. Noise from motor boats and jet skis on Lake Como within Zones I and II would not be restricted under any of the alternatives.

Alternatives 1 and 4

Alternatives 1 and 4 would prohibit ATV and motorcycle use seasonally on Road #550 west of its junction with Road #13200. All-terrain vehicle and motorcycle use would be allowed from 6/16-11/30. This would reduce the risk of disturbance to the Lake Como bald eagle nest during most of the nesting season, which would increase the chances of successfully fledging young eagles.

Alternatives 2 and 3

Alternatives 2 and 3 would allow continued ATV and motorcycle use on the portion of Road #550 west of its junction with Road #13200. Motorized disturbance on this road prism during the nesting season would continue to threaten bald eagle nesting success.

Summary of Direct and Indirect Effects to Bald Eagles

Alternatives 1 and 4 would reduce the risk of motorized disturbance impacts to bald eagles at the Lake Como nest to the same extent. **Alternatives 2 and 3** would maintain the existing risk of motorized disturbance impacts to nesting bald eagles at the Lake Como nest.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for bald eagles is the Bitterroot River drainage. This analysis area is appropriate to analyze any incremental effects from the actions of this project on bald eagles in combination with past, present, and reasonably foreseeable activities because implementing travel management decisions on the Bitterroot National Forest would have negligible effects to eagles in other drainages. The State level consideration is used to provide a broader context for the more localized effects analyzed.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for bald eagles, which is described in the Affected Environment section, above.

The impacts of travel management changes proposed in this FEIS are analyzed in the Direct and Indirect Effects section. Appendix A to the FEIS describes past, present, and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to bald eagles. Many forest activities have little effect on eagle populations, because:

- The activity does not occur in bald eagle nesting, roosting or foraging habitat
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to eagle populations include:

- Fire suppression
- Prescribed burning
- Invasive Plants Management
- Cattle Grazing
- Personal Use firewood cutting
- Personal use Christmas tree harvesting
- Special Uses/Permits (including Outfitter and Guide Activity)
- Activities on State Land

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Road and Trail Management

The existing road and trail systems in the vicinity of the Lake Como nest were in place long before the nest was discovered in 2003. Current access management on these roads and trails during the spring and summer nesting period has not changed since that time. Motorized and non-motorized use on roads and trails near the nest during the sensitive could potentially disturb nesting adults and reduce the productivity of this nest.

Public Use

Use of Lake Como by visitors recreating in motorboats and personal watercraft (jet skis) has increased over time, and has been encouraged in recent years by construction of an improved boat ramp and dock and by expanded campground facilities near the east end of the Lake. The noise created by these vessels as they speed up and down the lake may disturb eagles in or near the nest, although they are probably somewhat habituated to it. Rapidly-moving boats and the waves they create may also interfere with the eagles' attempts to forage for fish. The roads to the south and east of the nest have been groomed for cross-country ski use the past several winters. Grooming and cross-country skiing on groomed trails are not permitted within Zone 1 around the nest, but do occur within Zone 2 during the early part of the nesting period. These activities are unlikely to affect productivity of the Lake Como nest, since they are relatively quiet and are out of sight of the nest.

Activities on Private Land

The biggest potential impact to bald eagles in the Bitterroot drainage seems to be commercial and residential development of private lands in or near riparian floodplains along the Bitterroot River that reduce nesting and foraging opportunities for bald eagles. The availability of carrion from deer-vehicle collisions on several highways in the valley is an important food resource for eagles, particularly during the winter.

Timber Harvest, Prescribed Burning, and Associated Activities

The Forest has thinned most of the hillside above the south shore of Lake Como over the past several years as part of a fuels reduction project. Thinning occurred in the fall outside the nesting period, and did not occur within Zone 1 around the nest, but did occur within Zones 2 and 3. No other recent timber harvest or prescribed burning activities have occurred on Bitterroot National Forest System lands within the Nest Site Management Zones of the Lake Como nest or any other known bald eagle nest in the Bitterroot drainage. Reasonably foreseeable projects like The Como Forest Health Protection project do not include any treatments within the Nest Site Management Zones of the Lake Como nest.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to bald eagles slightly by reducing motorized access within the Nest Site Management Zone around the Lake Como bald eagle nest. This in turn would reduce the risk of human-caused disturbance to eagles in this territory. Cumulative effects to bald eagles from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to bald eagles because it would not change existing motorized access or the risk of human disturbance around any known bald eagle nest. All of the above listed present and reasonably foreseeable actions could have cumulative effects on bald eagles, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would not change the existing level of cumulative effects to bald eagles because it would not change existing motorized access or the risk of human disturbance around any known bald eagle nest. All of the above listed present and reasonably foreseeable actions could have cumulative effects on bald eagles, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to bald eagles slightly by reducing motorized access within the Nest Site Management Zone around the Lake Como bald eagle nest. This in turn would reduce the risk of human-caused disturbance to eagles in this territory. Cumulative effects to bald eagles from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to bald eagles by reducing motorized access within the Nest Site Management Zone around the Lake Como bald eagle nest. This in turn would reduce the risk of human-caused disturbance to eagles in this territory. **Alternatives 2 and 3** would not change the existing level of cumulative effects to bald eagles because they would not change existing motorized access or the risk of human disturbance around any known bald eagle nest.

Trends and Broader Context

Bald eagles have made a dramatic recovery in Montana and across the country since they were listed as Endangered in 1973. As a result of this recovery, USFWS downlisted bald eagles to threatened in 1995, and removed them from Federal listing as a threatened species in August 2007.

Pesticide use (especially DDT) caused bald eagle numbers to plummet throughout North America from the 1950s through the 1970s. It is unknown what effect local pesticide applications had to bald eagle populations, but it is likely that they had some negative impacts. Restrictions and bans on pesticide use, reduced use of poisons to control predators, and reduced shooting of raptors all combined to bolster eagle numbers. Bald eagles have recovered at the national, state, and local scales, and now occupy nests throughout the Bitterroot drainage.

Today, FWP classifies the bald eagle as a Special Status Species. The Montana Natural Heritage Program and FWP rank the bald eagle as a G5 S4 species (Montana FWP 2015). This means that across its range the species is considered common, widespread, and abundant (although it may be rare in parts of its range). It is not vulnerable in most of its range. In Montana, the species is considered apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining. There were only 12 known nesting pairs of bald eagles in Montana in 1973. By 2010, there were at least 557 identified bald eagle territories across Montana. Three hundred and eighty nine nests within these territories were monitored in 2010, and 347 of those nests were classified as active. Active nests with known outcomes fledged at least 332 young eagles in 2010. Fledging success was not determined for many of these nests, but extrapolating nesting success from the nests where productivity was determined yields an estimate of about 402 young eagles fledged in 2010 across Montana {Project File document WILD-072.pdf}.

The breeding population of bald eagles in the Bitterroot Valley has increased dramatically since the late 1990s, when the only two known active nests were on the Lee Metcalf National Wildlife Refuge and on state lands south of Lolo. At least 19 active bald eagle territories are now scattered along the entire length of the Bitterroot River. The Bitterroot Valley's bald eagle population swells during the winter when migrants join the resident birds, and the species is now a fairly common winter resident in the Bitterroot Valley.

<u>Effects Determination</u>

See the biological evaluation/assessment Summary (Section 3.5.8) for documentation of the effects determinations for bald eagles under these alternatives.

Alternatives 2 and 3

Implementation of **Alternatives 2 and 3** would have No Impact to bald eagle populations or habitat because they would not change the existing condition for motorized access within the Nest Site Management Zone around the Lake Como bald eagle nest. Cumulative impacts resulting from previous management actions would continue.

Alternatives 1 and 4

Alternatives 1 and 4 would reduce the risk of disturbance to nesting bald eagles by prohibiting ATV and motorcycle use seasonally on the section of Road #550 within the Nest Site Area around the Lake Como bald eagle nest. Other existing motorized access within the Nest Site Management Zone around this nest would still be permitted under both alternatives. Such access would represent a low, though continued, risk of disturbance to bald eagles using this nest. As a result, the effects determination for both **Alternatives 1 and 4** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

E. Wolverine (*Gulo gulo*) (Sensitive)

Legal Status

On February 4, 2013 the USFWS issued a proposed rule to list the wolverine in the contiguous United States as a threatened species under the Endangered Species Act (USDI Fish and Wildlife Service 2013). At the same time, USFWS published a proposed special rule under Section 4(d) of the ESA outlining the prohibitions necessary and advisable for the conservation of the wolverine (*Ibid*). This proposed Section 4(d) rule would prohibit take of wolverine from trapping, hunting, shooting, etc., while allowing incidental take associated with activities such as dispersed recreation, timber harvest, firefighting, mining, etc., if those activities are conducted in accordance with applicable laws and regulations (*Ibid*). However, USFWS subsequently withdrew the proposed rule on August 13, 2014 based on their conclusion that the factors affecting the distinct population segment (DPS) as identified in the proposed rule are not as significant as believed at the time of the proposed rule's publication (USDI Fish and Wildlife Service 2014a). With this withdrawal, the wolverine was once again classified as a sensitive species in Region 1. Several environmental groups are currently challenging the withdrawal of the wolverine listing proposal in court.

Effects Analysis Methods

Wolverines are generally solitary animals that range extensively through areas of alpine and subalpine habitats. Isolation from human presence and association with subalpine habitats characterize the general understanding of wolverine-habitat associations in the southern extent of the species’ North American range (Copeland et al. 2007). The growing popularity of winter backcountry recreation has resulted in winter recreation expanding into previously undisturbed and unreachable public lands that often represent high quality wolverine habitat. The potential effects of winter recreation on wolverine reproduction, behavior, habitat use and populations are unknown but there is some concern regarding the effects of winter recreation on the species, particularly in denning habitat (Heinemeyer and Squires 2014). Squires et al. (2007) demonstrated that wolverine populations in small, isolated mountain ranges can be very susceptible to trapping pressure. Therefore, the analysis assesses the potential for motorized winter recreational use to disturb wolverines in potential denning habitat, and the potential for winter access to facilitate trapping pressure in remote areas. The analysis also assesses the potential for motorized use on roads and trails to cause disturbance or mortality to wolverines in suitable habitat outside of the denning season.

Affected Environment

The wolverine is a rare-to-uncommon inhabitant of boreal coniferous forests and arctic tundra (Copeland 1996). Sightings of wolverines or wolverine sign are not common on the Forest, but occur frequently enough to indicate that wolverines are widely distributed in suitable habitat. Sightings are most frequent in the Bitterroot Range, but also occur in other parts of the Forest including the Sapphire Range {Project File document FPMON-036.pdf}. Recent sightings include a wolverine photographed at a baited camera station in upper Lost Horse Creek in January 2014, another photographed at a baited camera station (and later confirmed by DNA testing) in a tributary of the upper West Fork in March 2013; one released from a trap in Lost Horse Creek Canyon by FWP personnel in December 2011, and one seen on Trail #313 near the Sapphire Divide in July 2011. In addition, several wolverines caught by GYWP biologists and instrumented with GPS collars and/or VHF transmitters were documented using portions of the Forest in 2008-2009 (Greater Yellowstone Wolverine Program 2009). A previously reproductive female, F540, used a home range that generally included the southwestern portion of the Anaconda-Pintler Wilderness. F551, another previously reproductive female, used a large territory that included parts of the Bitterroot, Beaverhead-Deerlodge, and Salmon-Challis National Forests in Montana and Idaho, including both sides of U.S. Highway 93 and State Highway 43. This was the first confirmed record of a wolverine in the Allan Mountain IRA. Male M558 occupied a territory that overlapped the territories of these two females (*Ibid*).

Wolverine home ranges are very large, averaging approximately 150 square miles for females and 163 square miles for males in a study in northwest Montana (Hornocker and Hash 1981), 142 square miles for females and 611 square miles for males in a study in central Idaho (Copeland 1996), and 175 square miles for females and 448 square miles for males in a study in the Greater Yellowstone Area (Inman et al. 2007a). Copeland and Yates (2008) found that wolverine home ranges in Glacier National Park averaged about 54 square miles for females and 201 square miles for males, but speculated that these home ranges were smaller than those documented in other studies due to the rich and diverse wolverine habitat in their study area. Hornocker and Hash (1981) found that home ranges in Montana overlapped between individuals of the same and opposite sex, and territorial defense was essentially nonexistent. This may have been a result of consistent harvest removal of individuals in their study area. Conversely, Copeland (1996) and Inman et al. (2007a) found that adult home ranges in areas with limited harvest were segregated by sex with little overlap between individuals of the same sex, but that male home ranges encompassed up to three female home ranges. Wolverines feed primarily on rodents and carrion, although they are opportunists, and will consume berries, insects, fish, birds, and eggs when available. Ungulate carrion seems to be particularly important in the winter.

Wolverines have evolved to exploit a cold, low-productivity niche where growing seasons are brief, and food resources are limited, as shown by adaptations such as extremely large home ranges, territoriality, low densities, and low reproductive rates (Inman et al. 2012a). Wolverines were formerly thought to use a variety of habitats (Hornocker and Hash 1981; Reel et al. 1989; Butts 1992). Lofroth (1997) suggested that wolverine habitat was probably best defined in terms of adequate year-round food supplies in large, sparsely inhabited wilderness areas, rather than in terms of particular types of topography or plant associations. Recent studies have refined the understanding of wolverine habitat use, as fine-scale wolverine occurrence, documented via radio telemetry and GPS technology, has been strongly associated with high elevation alpine and avalanche environments (Copeland et al. 2007; Krebs et al. 2007; Lofroth and Krebs 2007; Inman et al 2007b, Copeland and Yates 2008). More specifically, Inman et al. (2012b) found that habitat in the areas wolverines selected in the Greater Yellowstone Ecosystem was characterized by steep terrain with a mix of tree cover, alpine meadow, boulders, and avalanche chutes.

Recent research indicates that wolverine distribution in the mountains of the western United States is closely tied to high-elevation areas containing alpine vegetation, alpine climatic conditions, or relatively high probabilities of spring snow cover (Aubry et al. 2007). Copeland et al. (2010) found that 95 percent of summer and 86 percent of winter telemetry locations from studies in North America and Fennoscandia were concordant with areas having spring snow coverage. They found that in montane habitats at southerly latitudes (such as Montana), wolverines remain at high elevations throughout the year, avoiding lower elevation habitats with xeric conditions (*Ibid*). Inman et al. (2012b) found that wolverines in the Greater Yellowstone Ecosystem selected elevations at and above tree-line during summer, and shifted to slightly lower areas centered at tree-line during winter. Copeland et al. (2007) found that wolverines in central Idaho favored high elevations throughout the year, and that the downward shift in elevation during the winter described by earlier investigators was relatively minor in their study area, and was restricted largely to males. They noted that carrion resulting from hunter-wounding losses was an important forage resource for wolverines in the winter, but that wolverines utilized carrion found in mid-elevation forests and largely avoided big game winter ranges despite the presence of an abundant food source. This apparent avoidance of ungulate winter ranges was also reported by Inman et al. (2012b) and Brock et al. (2007).

The locations of known wolverine dens appear to be strongly correlated with areas of persistent spring snow cover throughout the circumboreal range of the species (Copeland et al. 2010). Almost all known wolverine reproductive dens have been located in alpine, subalpine, taiga, or tundra habitats (Magoun and Copeland 1998). A critical feature of wolverine denning habitat appears to be dependability of deep snow throughout the denning period (February through mid-May). Almost all verified reproductive dens were under 1 – 5 meters of snow (*Ibid*). Within this deep snow zone, dens are typically in areas with abundant physical structure (Central Idaho Wolverine and Winter Recreation Research Study 2012). In a study in central Idaho, wolverine dens occurred in snow-covered boulder talus in subalpine cirque basins located at high elevations, and consisted of long, complex snow tunnels leading under inaccessible boulder scree that provided a high degree of security (Magoun and Copeland 1998). In the Yellowstone area, wolverine dens occurred in subalpine habitats near timberline, and were under avalanche debris consisting of downed logs (Inman et al. 2007b). Other wolverine dens have been documented under large piles of fallen trees in a recently burned area (Central Idaho Wolverine and Winter Recreation Research Study 2012) or under dead and down whitebark pine or subalpine fir just below treeline in Glacier National Park (Copeland and Yates 2008).

Wolverine habitat in the western United States appears to be restricted to the higher portions of mountain ranges, and is thus island-like in nature. Estimates of habitat capacity suggest that only six of these habitat islands are large enough to contain more than 20 adult female wolverines (Brock et al. 2007), or more than 50 total wolverines (Inman et al. 2013). Current levels of genetic diversity observed in U.S. populations indicate that a minimum of 400 breeding pairs of wolverines or 1-2 migrants per generation are required to ensure long-term genetic viability (Cegleski et al. 2006). This number of breeding pairs greatly exceeds the capacity of any one habitat island. The persistence of wolverine populations in the U.S. is thus likely to be dependent on dispersal and subsequent gene flow between these habitat islands (Inman et al. 2013, Brock et al. 2007). Schwartz et al. (2009) proposed that the Bitterroot Mountain chain forming the border between western Montana and eastern Idaho is a central "artery" for wolverine gene flow in the Rocky Mountains, potentially connecting wolverine populations in Glacier National Park and the Bob Marshall Wilderness and northern Idaho areas with those in the Greater Yellowstone Area and central Idaho.

Genetic testing has shown that wolverines throughout the Bitterroot drainage are part of the Rocky Mountain Front subpopulation (Cegleski, et al. 2003) that includes all of the mountainous areas of Montana west of I-15. The wolverine population in this large area is unknown, but is likely to be relatively small. For example, recent mark-recapture and genetic work in the Pioneer, Flint Creek, and Anaconda-Pintler Ranges, immediately to the southeast of the Bitterroot National Forest, estimated a total wolverine population in those ranges of between 7.4 and 9.2 animals in 2003, and between 9.9 and 15.7 animals in 2004 (Squires et al. 2007). Trapping pressure reduced the wolverine population in these ranges by an estimated 50 percent between 2003 and 2005, indicating a 30 percent annual population decline during the study (*Ibid*). Small, relatively isolated mountain ranges such as these are likely to contain only small numbers of wolverines, and are unlikely to provide refugia because high densities of forest roads and high-performance snowmobiles allow human access in all seasons. Localized trapping pressure can affect these small populations and cause population declines that are not sustainable (Squires et al. 2007).

Scientists with the Wildlife Conservation Society's (WCS) Greater Yellowstone Wolverine Program (GYWP), the Craighead Environmental Institute and several government agencies developed a wolverine habitat model based on habitat parameters including spring snow depth, terrain ruggedness index (related to steepness which implies the presence of talus/boulder fields and avalanche terrain), latitude-adjusted elevation (related to the location of timberline), conifer cover, forest edge, and road density (Brock et al. 2007). This model was further refined by Inman et al. (2013). The model outputs identified primary wolverine habitat in the western U.S. Primary wolverine habitat is the area within the climactic limits of wolverines that resident adult wolverines are expected to occupy. Model outputs were then overlaid with measured habitat criteria from 31 known wolverine den sites to identify areas likely to provide suitable wolverine denning habitat. Maternal habitat includes areas that contain attributes consistent with those measured around the known wolverine dens used in this study. (B. Inman, pers. comm.).

Table 3.5-6 displays the acres of predicted wolverine habitat in both of the habitat classifications for the Montana portion of the Forest, as well as for three distinct geographical areas of the Forest {Project File document WILD-074.pdf}, based on GIS analysis of the wolverine habitat map from Inman et al. (2013) {Project File document WILD 073.pdf}. The Triangle Area is the area south of Conner, Montana bounded by U.S. Highway 93, the West Fork Road, and the Montana-Idaho state line. This includes the Montana portion of the Allan Mountain IRA, as well as adjacent lands outside the IRA.

Table 3.5- 6: Predicted Wolverine Habitat Acres on the Montana Portion of the BNF

Wolverine Habitat Type	Wolverine Acres Total BNF (MT Portion)	Wolverine Acres Bitterroot Mtns	Wolverine Acres Sapphire-East Fork	Wolverine Acres Triangle Area
Primary Wolverine Habitat	442,376	233,397	124,581	84,398
Maternal Wolverine Habitat	102,606	65,264	24,687	12,655
Total Wolverine Habitat	544,982	298,661	149,268	97,053

The wolverine habitat map from Inman et al. (2013) {Project File document WILD-073.pdf} classifies most of the mid-to-upper elevation areas in the Bitterroot and Sapphire Mountains and the Allan Mountain IRA as primary wolverine habitat or maternal wolverine habitat. The combination of these two habitat classifications within each of these areas is extensive and relatively continuous. The large areas of wolverine habitat in the Bitterroot and Sapphire Mountains are connected by a fairly wide band of primary and maternal wolverine habitat associated with the high ridge along the Montana-Idaho divide through the Allan Mountain IRA.

Suitable wolverine denning habitat exists in the higher elevations in all the mountain ranges on the Forest. The Bitterroot Mountains provide an extensive area of high elevation, subalpine to alpine habitats that maintain snow cover well into the spring. Many of the basins within the Selway-Bitterroot Wilderness are very remote and receive very little human use, especially during the winter. The combination of these characteristics provides ideal denning and year-round habitat for wolverines. Predicted maternal habitat occurs in many of the cirque basins and along the upper elevations on many of the high ridges separating the canyons in the Bitterroots. In addition to providing a large core area of suitable habitat, the Bitterroot Range has been proposed as the central artery for wolverine gene flow in the Rocky Mountains, connecting wolverines at the southern extent of their current range to more robust populations in northwest Montana and Canada (Schwartz et al. 2009). The Blue Joint area is not currently Wilderness, and does not provide the same degree of protection from human disturbance as the adjacent Selway-Bitterroot and Frank Church - River of No Return Wilderness Areas, but still provides a large area of predicted primary wolverine habitat, along with scattered areas of predicted maternal habitat.

The Sapphire Range is smaller and lower in elevation, but still provides a band of predicted primary and maternal wolverine habitat at its mid-to-upper elevations, generally south of Sawmill Saddle. Predicted maternal habitat is more restricted and scattered than in the Bitterroots. Predicted maternal habitat is located mostly along higher elevation ridges in the upper Burnt Fork drainage, the area extending from Fox Peak to Rooster Comb and the Chain of Lakes area, and the East Fork Bitterroot – Rock Creek divide leading into the Anaconda-Pintler Wilderness. The area between Sawmill Saddle and Cleveland Mountain is not classified as suitable wolverine habitat. The amount of predicted wolverine habitat in the Sapphire Mountains (including those areas on adjacent National Forests) appears adequate to support no more than 3 to 5 female wolverine territories (B. Inman, pers. comm.).

The Allen Mountain IRA resembles the Sapphires in terms of predicted wolverine habitat. Most of the mid- to-upper elevations are classified as primary wolverine habitat. Predicted maternal habitat is largely limited to the vicinity of Piquett Mountain and Wiles Peak, the state line between Burrell Lake and the Hughes Point area, and the high ridges on either side of Saddle Mountain. The Allan Mountain IRA and the Sapphire Mountains are both connected to the Anaconda-Pintler Wilderness by high ridgelines, and probably share a small wolverine sub-population with one identified for the Anaconda-Pintler, the Pioneers, and the Flint Creek Range (Squires et al. 2007). The Allan Mountain IRA connects wolverine sub-populations in the Bitterroot Mountains on the west side of the Bitterroot Valley with those in the Sapphire Mountains, the Anaconda-Pinter Wilderness, and other ranges in southwest Montana. The Sapphires may function as a secondary linkage route for wolverine dispersal between southwest Montana and areas to the north and east of Missoula, although the Flint Creek Range and the John Long Mountains provide other potentially suitable dispersal routes between these areas.

Human activities have been identified as a leading cause of wolverine deaths. Several recent publications address mortality risks for wolverines. Krebs et al. (2004) summarized the results of 12 previous studies using radio marked wolverines in North America. They found that human-caused mortality accounted for 46 percent of known wolverine deaths in trapped populations, but was not detected in untrapped populations. Eighty-eight percent of these human-caused mortalities were due to trapping or hunting, while 12 percent resulted from vehicle collisions. Squires et al. (2007) found that 64 percent of known wolverine mortalities were a result of trapping in three study areas in western Montana. They found that trapping even affected the wolverine population in Glacier National Park, since the Park is not large enough to prevent individual wolverines from travelling outside its boundaries into areas where trapping is permitted. Persson et al. (2009) found that up to 60 percent of the wolverine mortalities in their study area in Scandinavia were caused by poaching. Most of these human-caused mortalities occurred in the winter during the trapping season, and all three of the publications cited previously in this paragraph suggest that improved access into wolverine habitat by snowmobiles during the winter has increased the risk of human-caused mortalities to wolverines. Tomasik and Cook (2005) stated that increased road access usually results in greater hunting and trapping pressure, which is a primary mortality factor for wolverines. All 15 of the wolverines known to have been harvested by trappers in Ravalli County since 1976 came from areas where over-snow vehicle access along roads may have facilitated access to wolverine habitat {Project File document WILD-062.pdf}. Human access into potential wolverine habitat is therefore a concern.

Researchers have reported that female wolverines may be sensitive to human disturbance in the vicinity of natal and maternal dens, and may abandon dens and move their kits a considerable distance if they detect human presence in the area (Copeland 1996, Magoun and Copeland 1998). This could reduce kit survival rates by increasing the potential for predation or reducing the amount of time the female can spend procuring food. However, more recent reports indicate that wolverines may be able to tolerate at least some close approach by humans without abandoning their dens (Heinemeyer and Squires 2014, Heinemeyer and Squires 2013, Heinemeyer et al. 2010; Inman et al. 2007b; Persson et al. 2006). Human disturbance in wolverine habitat during the winter may also affect reproductive success by reducing the ability of female wolverines to hunt or to utilize food caches. These caches (typically carrion) appear to be critical in providing enough calories for female wolverines to accumulate sufficient energy reserves to successfully bear and raise a litter (Inman et al. 2012a).

Preliminary results of an ongoing study in central Idaho designed to address whether winter recreational use is compatible with denning wolverines indicate that some wolverines do reside in landscapes that have relatively high levels of winter recreation, and at the home range scale are not excluded from these areas (Heinemeyer and Squires 2014, Heinemeyer and Squires 2013; Central Idaho Wolverine and Winter Recreation Research Study. 2012; Heinemeyer et al. 2010). However, wolverine movement rates increased notably when the animals were within portions of their home ranges with higher recreation use, and those movement rates were highest on days of the week when recreational activities were high. The data suggests that these increased movement rates are due to fewer resting periods in recreated areas. This may result in significant additive energetic effects on wolverines during the critical winter and denning periods (Heinemeyer and Squires 2013). In addition, denning female wolverines in highly recreated areas were less active during the day and more active at night compared to females in areas with little recreation. Leaving the cubs unattended at night may increase their exposure to risk factors such as predation or low temperatures (*Ibid*). These preliminary results indicate that winter recreation may impact wolverines in as yet unknown ways. However, the recent USFWS listing proposal did not identify management activities of land management agencies, including winter recreation and timber harvest, as threats to wolverines (USDI Fish and Wildlife Service 2013).

Most of the mid-to-upper elevations on the Forest outside Designated Wilderness are currently open to over-snow vehicles during the wolverine denning season. Since human disturbance to denning wolverines could potentially result in reduced wolverine reproductive success or in increased wolverine mortality, the wolverine analysis used GIS to determine the percentage of predicted wolverine habitat acres from the Inman et al. (2013) model that are open to over-snow vehicles to compare the effects of the alternatives to wolverines {Project File document WILD-074.pdf}. Table 3.5-7 displays the number and percentage of acres of predicted wolverine habitat in each of the three habitat classifications that are currently open to over-snow vehicle use for the Montana portion of the Forest, as well as for three distinct geographical areas of the Forest.

Table 3.5- 7: Predicted Wolverine Habitat Acres on the BNF Open to Over-snow Vehicles, Existing Condition

Wolverine Habitat Type	Wolverine Acres MT Portion BNF	Acres and (%) Open to Over-snow Vehicles	Wolverine Acres Bitterroot Mtns.	Acres and (%) Open to Over-snow Vehicles	Wolverine Acres Sapphire East Fork	Acres and (%) Open to Over-snow Vehicles	Wolverine Acres Triangle Area	Acres and (%) Open to Over-snow Vehicle
Primary Wolverine Habitat	442,376	264,461 (59.8%)	233,397	91,517 (39.2%)	124,581	89,730 (72.0%)	84,398	83,214 (98.6%)
Maternal Wolverine Habitat	102,606	46,264 (45.1%)	65,264	16,740 (25.6%)	24,687	17,329 (70.2%)	12,655	12,195 (96.4%)
Total Wolverine Habitat	544,982	310,725 (57.0%)	298,661	108,257 (36.2%)	149,268	107,059 (71.7%)	97,053	95,409 (98.3%)

Outside of the denning season, wolverines do not appear to avoid people or roads and trails, and are sometimes found near trails and active campgrounds during summer (Copeland et al. 2007). They will also use unmaintained winter roads for travel (*Ibid*).However, motorized access increases the risk of human-caused mortality to wolverines, through poaching and vehicle impacts. As a result, the total length of motorized roads and trails in predicted wolverine habitat was used to compare the relative risk of impacts of motorized use to wolverines in the summer {Project File document WILD-159.pdf}. Table 3.5-8 displays the existing condition for open road and trail miles in predicted wolverine habitat within the three geographical areas used previously in Table 3.5-6. Both predicted wolverine habitat types were combined for this analysis because the summer period is outside the wolverine denning season.

Table 3.5- 8: Open Road and Trail Miles in Predicted Wolverine Habitat, Existing Condition

Open Road/Trail Miles in Predicted Wolverine Habitat, Summer	Open Road Miles	Open ATV Trail Miles	Open single-track Trail Miles
Bitterroot Mountains	26.5	0.7	53.5
Sapphire-East Fork	104.5	39.6	73.6
“Triangle” Area	13.9	38.7	65.8
BNF Total (MT portion)	144.9	79	192.9

Direct and Indirect Effects

Summer

Table 3.5-9 displays the open road and trail miles in predicted wolverine habitat within the three geographical areas following implementation of the alternatives {Project File document WILD-159.pdf}. All three predicted wolverine habitat types were combined for this analysis because the summer period is outside the wolverine denning season.

Table 3.5- 9: Open Road and Trail Miles in Predicted Wolverine Habitat, by Alternative

Open Road/Trail Miles in Predicted Wolverine Habitat, Summer	Open Road Miles	Open ATV Trail Miles	Open single-track Trail Miles
Alternative 1			
Bitterroot Mountains	23.1	0	30.5
Sapphire-East Fork	102.9	27.3	25.2
“Triangle” Area	13.9	43.2	50.4
BNF Total (MT portion)	139.9	70.5	106.1
Alternative 2			
Bitterroot Mountains	26.5	0.7	53.5
Sapphire-East Fork	104.5	39.6	73.6
“Triangle” Area	13.9	38.7	65.8
BNF Total (MT portion)	144.9	79	192.9
Alternative 3			
Bitterroot Mountains	26.4	0.7	58.1
Sapphire-East Fork	105.5	40.2	98.9
“Triangle” Area	13.9	44	69
BNF Total (MT portion)	145.8	84.9	226
Alternative 4			
Bitterroot Mountains	12.1	0	2.2
Sapphire-East Fork	64.1	11.5	6.5
“Triangle” Area	7.8	10.3	0
BNF Total (MT portion)	84	21.8	8.7

Alternative 1

Alternative 1 would reduce the miles of roads open to motorized use during the summer within predicted wolverine habitat by about 5 miles (3.5percent), compared to **Alternative 2**. Most of these road miles are in predicted wolverine habitat in the Bitterroot Mountains area, but some are in the Sapphire-East Fork area (Table 3.5-9). **Alternative 1** would reduce the miles of two-track trails open to motorized use during the summer within predicted wolverine habitat by a net amount of about 8.5 miles (10.8 percent). 13 miles of two-track trail in predicted wolverine habitat would be closed, mostly in the Sapphire-East Fork area, but 4.5 miles of two-track trail would be opened to motorized use in the Triangle area (*Ibid*). **Alternative 1** would reduce the miles of single-track trails open to motorcycle use during the summer within predicted wolverine habitat by about 86.8 miles (45 percent). Over half these trail miles are in predicted wolverine habitat in the Sapphire-East Fork area, with the remainder split between the Bitterroot Mountains and “Triangle” areas (*Ibid*).

Although wolverines do not seem to avoid roads, trails, and human presence in suitable habitats during the summer, reduced motorized access to several remote areas would benefit wolverines to some extent by reducing mortality risk due to poaching or vehicle impacts. **Alternative 1** would not affect the physical structure of wolverine habitat. The net effect from reducing motorized access to local wolverine habitat and populations is expected to be positive for wolverines.

Alternative 2

Alternative 2 would not reduce the potential for human disturbance and mortality to wolverines during the summer because it would not change existing motorized access. About 144.9 miles of roads, 79 miles of two-track trails, and 192.9 miles of single-track trails would remain open to motorized use within predicted wolverine habitat (Table 3.5-9). The percentage of the Forest outside the zone of motorized influence would remain at 45.7 percent {Project File document WILD-070.pdf}. The existing motorized access to more remote, higher elevation terrain would not change, which would continue to present a mortality risk due to poaching or vehicle impacts in these areas. This alternative would not affect the existing physical structure of wolverine habitat because roads and trail treads are already in place.

Alternative 3

Alternative 3 would increase the total miles of roads open to motorized use during the summer within predicted wolverine habitat by about 0.9 miles (0.6 percent), compared to **Alternative 2**. All of these road miles are in predicted wolverine habitat in the Sapphire-East Fork area (Table 3.5-9). **Alternative 3** would increase the miles of two-track trails open to motorized use during the summer within predicted wolverine habitat by about 5.9 miles (7.5 percent). Most of these trail miles are in predicted wolverine habitat in the Triangle area, but some are in the Sapphire-East Fork area (*Ibid*). **Alternative 3** would increase the miles of single-track trails open to motorcycle use during the summer within predicted wolverine habitat by about 33.1 miles (17.2 percent). Most of these trail miles are in predicted wolverine habitat in the Sapphire-East Fork area, with the remainder split between the Bitterroot Mountains and “Triangle” areas (*Ibid*).

Overall, **Alternative 3** would increase the potential for human disturbance and mortality to wolverines during the summer somewhat because it would increase motorized access to predicted wolverine habitat along much of the length of Trail #313 between Skalkaho Pass and Abundance Saddle, as well as in a few of the higher elevation recommended additions to the Selway-Bitterroot Wilderness Area in the Bitterroot Mountains, such as Watchtower Creek and the area around High Lake in the Blodgett Creek drainage.

Although wolverines do not seem to avoid roads, trails, and human presence in suitable habitats during the summer, increased motorized access to remote areas could be detrimental to wolverines by increasing mortality risk due to poaching or vehicle impacts. **Alternative 3** would have no effects to the physical structure of wolverine habitat because roads and trail treads are already in place. However, the net effect from increasing motorized access to local wolverine habitat and populations is expected to be slightly negative for wolverines.

Alternative 4

Alternative 4 would reduce the total miles of roads open to motorized use during the summer within predicted wolverine habitat by about 60.9 miles (42 percent). Over half of these road miles are in predicted wolverine habitat in the Sapphire-East Fork area, with the remainder split between the Bitterroot Mountains and “Triangle” areas (Table 3.5-9). **Alternative 4** would reduce the miles of two-track trails open to motorized use during the summer within predicted wolverine habitat by about 57.2 miles (72.4 percent). Trail miles that would be closed in predicted wolverine habitat are evenly split between the Sapphire-East Fork and “Triangle” areas, with a minor amount in the Bitterroot Mountains area (*Ibid*). **Alternative 4** would reduce the miles of single-track trails open to motorcycle use during the summer within predicted wolverine habitat by about 184.2 miles (95.5 percent). This would include all of the single-track trail miles in predicted wolverine habitat in the “Triangle” area, and almost all of the single-track trail miles in predicted wolverine habitat in the Sapphire-East Fork and Bitterroot Mountain areas (*Ibid*).

Although wolverines do not seem to avoid roads, trails, and human presence in suitable habitats during the summer, reduced motorized access to many remote areas would benefit wolverines to a moderate degree by reducing mortality risk due to poaching or vehicle impacts. **Alternative 4** would not affect the physical structure of wolverine habitat.

The net effect from reducing motorized access to most local wolverine habitat and populations is expected to be strongly positive for wolverines.

Over-Snow

Table 3.5-10 displays the number of acres and percentage of predicted wolverine habitat in each of the three habitat classifications that would be open to over-snow vehicle use for the Montana portion of the Forest, as well as for three distinct geographical areas of the Forest, under each of the alternatives.

Table 3.5- 10: Acres and Percentage of Predicted Wolverine Habitat Open to Over-snow Vehicles on the Montana Portion of the Bitterroot National Forest, by Alternative

Wolverine Habitat Acres and Percentages Open to Over-snow Vehicles								
Alternative/Habitat Type	**Total BNF (Montana portion)**	**% Habitat Open to Over-snow Vehicles**	**Bitterroot Mountains**	**% Habitat Open to Over-snow Vehicles**	**Sapphire East Fork**	**% Habitat Open to Over-snow Vehicles**	**Triangle" Area**	**% Habitat Open to Over-snow Vehicles**
Total - Primary Wolverine Habitat	442,376		233,397		124,581		84,398	
Total - Maternal Wolverine Habitat	102,606		65,264		24,687		12,655	
Total - Wolverine Habitat	544,982		298,661		149,268		97,053	
Acres and % of total area open to over-snow vehicles								
Alt. 1 - Primary Wolverine Habitat	168,356	38.1	21,377	9.2	63,765	51.2	83,214	98.6
Alt. 1 - Maternal Wolverine Habitat	27,854	27.1	4,724	7.2	10,935	44.3	12,195	96.4
Alt. 1 - Total Wolverine Habitat	196,210	36	26,101	8.7	74,700	50	97,053	98.3
Alt. 2 - Primary Wolverine Habitat	264,461	59.8	91,517	39.2	89,730	72	83,214	98.6
Alt. 2 - Maternal Wolverine Habitat	46,264	45.1	16,740	25.6	17,329	70.2	12,195	96.4
Alt. 2 - Total Wolverine Habitat	310,725	57.1	108,257	36.2	107,059	71.7	95,409	98.3
Alt. 3 - Primary Wolverine Habitat	264,752	59.8	91,796	39.3	89,742	72	83,214	98.6
Alt. 3 - Maternal Wolverine Habitat	46,407	45.2	16,883	25.9	17,329	70.2	12,195	96.4
Alt. 3 - Total Wolverine Habitat	311,159	57.1	108,679	36.4	107,071	71.7	95,409	98.3
Alt. 4 - Primary Wolverine Habitat	58,739	13.3	9,170	3.9	34,351	27.6	15,218	18
Alt. 4 - Maternal Wolverine Habitat	5,369	5.2	480	0.7	3,813	15.4	1,076	8.5
Alt. 4 Total Wolverine Habitat	64,108	11.8	9,650	3.2	38,164	25.6	16,294	16.8

Wolverine habitat data from Inman et al. 2013

Alternative 1

Alternative 1 would allow over-snow vehicle use on approximately 46.4 percent of the Montana portion of the Forest (522,592 acres) throughout the winter, and on approximately 3.7 percent of the Montana portion of the Forest (41,856 acres) seasonally, generally after the rifle season {Project File document WILD-071.pdf}. Over-snow vehicle use would be allowed in about 38.1 percent of the predicted primary wolverine habitat across the Forest, a decrease of about 96,105 acres from the existing condition (**Alternative 2)**. Over-snow vehicle use would be allowed in about 27.1 percent of the predicted maternal wolverine habitat across the Forest, a decrease of about 18,410 acres from the existing condition. In total, **Alternative 1** would decrease the amount of predicted wolverine habitat open to over-snow vehicle use by about 114,515 acres compared to the existing condition {Project File document WILD-074.pdf}.

Alternative 1 would prohibit over-snow vehicle access in the northern part of the Stony Mountain IRA, the northern half of the Sapphire WSA, the Blue Joint Recommended Wilderness., and most of the rest of the Blue Joint WSA outside of recommended wilderness {Project File document WILD-075.pdf}. All of these areas contain large expanses of predicted primary wolverine habitat. The Stony Mountain IRA and the northern half of the Sapphire WSA also contain a substantial portion of the predicted maternal wolverine denning habitat in the Sapphire Range. The Blue Joint Recommended Wilderness and WSA contain scattered, smaller areas of predicted maternal wolverine denning habitat along the state line ridge and around Razorback Mountain and Deer Creek Point (*Ibid*).

Alternative 1 would also prohibit over-snow vehicle access to all of the recommended additions to the Selway-Bitterroot Wilderness Area, and to large portions of the Selway-Bitterroot IRA that are adjacent to the Selway-Bitterroot Wilderness {Project File document WILD-075.pdf}. Most of these additions and sections are relatively small areas near the canyon mouths on the east face of the Bitterroot Range that receive no or very little over-snow vehicle use currently due to steepness or lack of access, and/or are too low to provide suitable wolverine denning habitat. Restricting over-snow vehicle use in these areas would thus have little effect on the potential for disturbing wolverine denning habitat. However, several of the recommended wilderness additions (North Lost Horse, Blodgett Creek and Sheephead Creek) and at least one section of the Selway-Bitterroot IRA (Lost Horse Creek) contain extensive areas of predicted maternal wolverine habitat, and may be accessible by over-snow vehicles. Restricting such use in these areas could benefit wolverines by reducing the potential for human disturbance to dens, and by reducing access to wolverine habitat for trappers. The upper Camas Creek basin section of the Selway-Bitterroot IRA also contains extensive areas of predicted maternal wolverine habitat, but over-snow vehicle access would be allowed in this section under **Alternative 1**.

Most of the high quality predicted wolverine denning habitat on the Forest is high in the Selway-Bitterroot and Anaconda-Pintler Wilderness Areas, and is largely inaccessible to backcountry skiing during the denning season. Under **Alternative 1**, predicted wolverine denning habitat along the Sapphire divide in the southern half of the Sapphire WSA, in the Allan Mountain IRA, and in the upper Camas Creek basin section of the Selway-Bitterroot IRA would remain accessible to over-snow vehicle use and backcountry skiing facilitated by such use. Wolverine dens in these areas would remain susceptible to disturbance, which could result in reduced wolverine productivity. Over-snow vehicle access into the high elevation areas that wolverines frequent also increases the risk of wolverine mortality due to trapping. Since the wolverine population in the Sapphires and other areas on the east side of the Bitterroot Valley is likely quite small and relatively isolated from other wolverine populations, loss of kits due to disturbance or several individuals due to trapping could potentially result in extirpation of wolverines from this area.

Alternative 1 would prohibit over-snow vehicle use in some high elevation areas on the Bitterroot National Forest that contain predicted wolverine denning habitat. This would reduce the risk of motorized impacts, such as disturbance to wolverine populations during the critical denning season, which in turn would reduce the risk of impacts to wolverine productivity. Reducing the risk of motorized impacts during the denning season would be positive for wolverines.

Alternative 2

Alternative 2 would continue the existing condition for over-snow vehicle access across the Forest. Currently, such use is allowed on approximately 62.1% of the Montana portion of the Forest (699,884 acres) throughout the winter, and on approximately 4.3% of the Montana portion of the Forest (49,097 acres) seasonally (generally after the rifle season) {Project File document WILD-071.pdf}. **Alternative 2** would not reduce the potential for human disturbance to wolverine dens because existing access to higher elevations for over-snow vehicles and backcountry skiing would continue. Human presence in the vicinity of wolverine dens could result in reduced foraging success for adult females already stressed by the demands of bearing and raising a litter (Heinemeyer and Squires 2013; Inman et al. 2012a), or even in den abandonment (Copeland 1996, Magoun and Copeland 1998). Either could in turn reduce reproductive success for wolverines.

Most of the high quality predicted wolverine denning habitat on the Forest is high in the Selway-Bitterroot and Anaconda Pintler Wilderness Areas, and is largely inaccessible to backcountry skiing during the denning season. Predicted wolverine denning habitat along the Sapphire divide in the Sapphire WSA and the Stony Mountain IRA, and in the Allan Mountain IRA and the Blue Joint WSA (including the Blue Joint Recommended Wilderness) would remain accessible to over-snow vehicle use and backcountry skiing facilitated by such use {Project File document WILD-076.pdf}. **Alternative 2** would not restrict over-snow vehicle access to any of the recommended additions to the Selway-Bitterroot Wilderness Area (*Ibid*). Wolverine dens in these areas would remain susceptible to disturbance, which could result in reduced wolverine productivity. Motorized access into the high elevation areas that wolverines frequent also increases the risk of wolverine mortality due to trapping. Since the wolverine population in the Sapphires and other areas on the east side of the valley is likely quite small and relatively isolated from other wolverine populations, loss of a litter due to disturbance or one or two individuals due to trapping could potentially result in extirpation of wolverines from this area.

Alternative 2 would not affect the suitability of vegetative habitat for wolverines. It would not change the existing condition for wolverines in terms of the potential for den disturbance resulting from motorized recreation, or the risk of trapping or poaching mortality.

Alternative 3

Alternative 3 would allow over-snow vehicle use on approximately 62.5 percent of the Montana portion of the Forest (704,563 acres) throughout the winter, and on approximately 4.3 percent of the Montana portion of the Forest (49,097 acres) seasonally (generally after the rifle season) {Project File document WILD-071.pdf}. Over-snow vehicle use would be allowed in about 59.8 percent of the predicted primary wolverine habitat across the Forest, a slight increase of about 291 acres from the existing condition. Over-snow vehicles would be allowed in about 45.2 percent of the predicted maternal wolverine habitat across the Forest, a small increase of about 143 acres from the existing condition. In total, **Alternative 3** would increase the amount of predicted wolverine habitat open to over-snow vehicles by about 434 acres compared to the existing condition {Project File document WILD-074.pdf}.

Most of the high quality predicted wolverine denning habitat on the Forest is high in the Selway-Bitterroot and Anaconda Pintler Wilderness Areas, and is largely inaccessible to backcountry skiing during the denning season. Under this alternative, predicted wolverine denning habitat along the Sapphire divide in the Sapphire WSA, and the Stony Mountain IRA, and in the Allan Mountain IRA, the Blue Joint WSA, the Blue Joint Recommended Wilderness, several of the recommended wilderness additions (North Lost Horse, Blodgett Creek and Sheephead Creek) and the Lost Horse Creek and upper Camas Creek basin sections of the Selway-Bitterroot IRA would remain accessible to over-snow vehicle use and backcountry skiing facilitated by such use {Project File document WILD-077.pdf}. Wolverine dens in these areas would remain susceptible to disturbance, which could result in reduced wolverine productivity. Over-snow vehicle access into the high elevation areas that wolverines frequent also increases the risk of wolverine mortality due to trapping. Since the wolverine population in the Sapphires and other areas on the east side of the Bitterroot Valley is likely quite small and relatively isolated from other wolverine populations, loss of a litter due to disturbance or several individuals due to trapping could potentially result in extirpation of wolverines from this area.

Alternative 3 would allow over-snow vehicle access to a small number of currently closed high-elevation acres on the Bitterroot National Forest that contain predicted wolverine denning habitat. This would increase the risk of motorized impacts to wolverine populations during the critical denning season, which in turn would increase the risk of impacts to wolverine productivity. Increasing the risk of motorized impacts during the denning season would be negative for wolverines.

Alternative 4

Alternative 4 would allow over-snow vehicle use on approximately 28.3 percent of the Montana portion of the Forest (318,582 acres) throughout the winter, and on approximately 3.7 percent of the Montana portion of the Forest (41,856 acres) seasonally (generally after the rifle season) {Project File document WILD-071.pdf}. Over-snow vehicle use would be allowed in about 13.3 percent of the predicted primary wolverine habitat across the Forest, a decrease of about 205,722 acres from the existing condition (**Alternative 2**). Over-snow vehicle use would be allowed in about 5.2 percent of the predicted maternal wolverine habitat across the Forest, a decrease of about 40,895 acres from the existing condition. In total, **Alternative 4** would decrease the amount of predicted wolverine habitat open to over-snow vehicles by about 246,617 acres compared to the existing condition {Project File document WILD-074.pdf}.

Alternative 4 would prohibit over-snow vehicle access to the Sapphire Crest in the Stony Mountain IRA and the Sapphire WSA, in the Blue Joint WSA as well as the Blue Joint Recommend Wilderness, and in the Allan Mountain IRA {Project File document WILD-078.pdf}. All of these areas contain large amounts of predicted primary wolverine habitat. The Stony Mountain IRA and the Sapphire WSA contain most of the predicted maternal wolverine denning habitat in the Sapphire Range, while the Allen Mountain IRA contains several large areas of this wolverine habitat type. The Blue Joint Recommended Wilderness and Blue Joint WSA contain scattered, smaller areas of predicted maternal habitat. **Alternative 4** would also prohibit over-snow vehicle access to all of the recommended additions to the Selway-Bitterroot Wilderness Area, and to large portions of the Selway-Bitterroot IRA that are adjacent to the Selway-Bitterroot Wilderness, including the upper Camas Creek basin {Project File document WILD-078.pdf}. Effects to wolverines of prohibiting over-snow vehicle use in these recommended additions to the Selway-Bitterroot Wilderness and in sections of the Selway-Bitterroot IRA would be the same as those described under **Alternative 1,** except that prohibiting such use in the upper Camas Creek basin would increase the benefits to wolverines. Restricting over-snow vehicle use in these areas could benefit wolverines by reducing the potential for human disturbance to dens, and by reducing access to wolverine habitat for trappers.

Alternative 4 would prohibit over-snow vehicle use in most of the predicted maternal denning habitat on the Forest, including that which is outside Designated Wilderness. Most of the high quality potential wolverine denning habitat on the Forest is high in the Selway-Bitterroot and Anaconda Pintler Wilderness Areas, and is largely inaccessible to backcountry skiing during the denning season. Motorized access into the high elevation areas that wolverines frequent also increases the risk of wolverine mortality due to trapping. Since the wolverine population in the Sapphires and other areas on the east and south sides of the valley is likely quite small and relatively isolated from other wolverine populations, loss of a litter due to disturbance or several individuals due to trapping could potentially result in extirpation of wolverines from this area.

Alternative 4 would prohibit over-snow vehicle use in most of the high elevation areas on the Bitterroot National Forest that contain predicted wolverine denning habitat. This would greatly reduce the risk of motorized impacts, such as disturbance to wolverine populations during the critical denning season, which in turn would greatly reduce the risk of impacts to wolverine productivity. Eliminating most of the risk of motorized impacts during the denning season would be strongly positive for wolverines.

Table 3.5-11 summarizes the status of over-snow vehicle access to potentially important areas of predicted wolverine denning habitat outside of Designated Wilderness.

Table 3.5- 11: Summary of Over-snow Vehicle Access to Areas Containing Predicted Wolverine Denning Habitat

Area	Importance for Wolverine	Alt. 1 Status	Alt. 2 Status	Alt. 3 Status	Alt. 4 Status
Stony Mtn. IRA	High	Northern portion closed Southern portion open	Open	Open	Closed
Sapphire WSA	High	North ½ Closed South 1/2 Open	Open	Open	Closed
Recommended Wilderness , Blodgett Creek	Moderate	Closed	Open	Open	Closed
Recommended Wilderness, North Lost Horse	High	Closed	Open	Open	Closed
Recommended Wilderness, Sheephead-Watchtower	High	Closed	Open	Open	Closed
Recommended	Moderate	Closed	Open	Open	Closed

Area	Importance for Wolverine	Alt. 1 Status	Alt. 2 Status	Alt. 3 Status	Alt. 4 Status
Wilderness, Blue Joint					
Blue Joint WSA outside the Blue Joint Recommended Wilderness	Moderate	Northern 10% Open Southern 90% Closed	Open	Open	Closed
Selway-Bitterroot IRA, Camas Lakes Basin section	Moderate	Open	Open	Open	Closed
Selway-Bitterroot IRA, Lost Horse section	High	Closed	Open	Open	Closed
Allen Mtn. IRA	High	Open	Open	Open	Closed

Summary of Direct and Indirect Effects to Wolverines

Alternative 1 would reduce the risk of motorized impacts to wolverines during the denning season and during the summer more than **Alternatives 2 and 3**, but less than **Alternative 4**. **Alternative 3** is the only alternative that would increase the risk of motorized impacts to wolverines during the denning season and during the summer, albeit slightly.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for wolverines is the Bitterroot National Forest and adjacent forested areas that provide potential wolverine habitat on the Lolo, Beaverhead-Deerlodge, Salmon-Challis and Clearwater-Nez Perce National Forests. This analysis area is appropriate to analyze any incremental effects from the actions of this project on wolverines in combination with past, present, and reasonably foreseeable activities because wolverines that inhabit the high ridges that form the boundaries of the Bitterroot National Forest almost certainly include portions of adjacent national forests within their territories. However, the effects of implementing travel management decisions on the Bitterroot National Forest would have negligible effects to wolverines in more distant areas.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for wolverines, which is described in the Affected Environment section, above.

The impacts of travel management activities proposed in this EIS are analyzed in the Direct and Indirect Effects section. Appendix A to the FEIS describes past, present, and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to wolverines.

Many forest activities have little effect on wolverine populations, because:

- The activity does not occur in wolverine habitat;
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to wolverine populations include:

- Prescribed burning
- Invasive Plants Management
- Cattle Grazing
- Personal Use firewood cutting
- Personal use Christmas tree harvesting
- Special Uses/Permits (including Outfitter and Guide Activity)

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Fire Suppression

Decades of fire suppression allowed more trees to become established in upper elevation areas. This may have reduced the extent of meadows and other open areas, which in turn may have reduced the wolverine's typical summer prey base of ground squirrels and marmots. Recent large fires may have reversed this trend to some extent.

Road and Trail Management

The road system on the Bitterroot National Forest constructed largely to facilitate timber harvest increased summer and winter human access to wolverine habitat, which in turn increased the risk of wolverine mortality due to trapping, poaching, or vehicle impacts to some extent. Similar roading increased wolverine mortality risk on portions of adjacent national forests, including areas north and south of the Welcome Creek Wilderness on the Lolo National Forest; some areas in the upper Rock Creek drainage and the area between the Anaconda-Pinter Wilderness Area and Lost Trail Pass on the Beaverhead-Deerlodge National Forest; and the area along the Montana-Idaho state line between Blue Nose Lookout and Wood's Creek Pass on the Salmon-Challis National Forest. Other than these areas, most of the potential wolverine habitat within the cumulative effects area outside the Bitterroot National Forest boundary is within designated Wilderness, wilderness study areas, and/or inventoried roadless areas, and is unroaded. Some of these areas contain motorized trails, which also increase human access to wolverine habitat, and can result in risks to wolverines similar to those caused by roads.

Public Use

The growing use and increasing capabilities of over-snow vehicles over the past several decades likely increased the risk of disturbing wolverines during the denning season, which may have impacted wolverine productivity. Frequent over-snow vehicle use in some areas (such as the southern half of the Sapphire WSA) may have caused wolverines to abandon portions of those areas as potential denning sites. The risk of trapping mortality to wolverines also increased as more of the high country areas that provide wolverine habitat became accessible by over-snow vehicles. Areas of potential wolverine habitat that are currently accessible to over-snow vehicles and are adjacent to the Bitterroot National Forest include the ridges and basins on the east side of the Sapphire Divide in the vicinity of Cleveland Mountain and between Sawmill Saddle and the Anaconda-Pintler Wilderness; the area near the ridge that separates the East Fork Bitterroot River drainage from the Trail Creek drainage between the Anaconda-Pinter Wilderness and Lost Trail Pass; and areas on the south side of the ridge that forms the Idaho-Montana state line between Lost Trail Pass and the Reynolds Lake Trailhead west of Woods Creek Pass. Areas currently used by over-snow vehicles include wilderness study areas and inventoried roadless areas, but not designated Wilderness.

Timber Harvest, Prescribed Burning, and Associated Activities

Previous timber harvest units in higher elevation roaded areas of the Bitterroot National Forest and adjacent national forests changed the vegetative structure in some areas of predicted wolverine habitat. Such changes likely had little effect on wolverines, which are a habitat generalist. The relatively open stand structure typically created by timber harvest in upper elevations may have resulted in increased numbers of ground squirrels and marmots, which are important wolverine prey items in the summer. Changes to upper elevation stand structures did not affect the permeability of those areas for dispersing wolverines.

Timber harvest in ongoing or reasonably foreseeable timber sales, such as the Three Saddle Vegetation Management Project and the Como Forest Health Protection project, is largely at elevations below predicted wolverine habitat, but some units may affect existing wolverine habitat to some extent. These harvest proposals also include some road closures, some of which may reduce motorized access to wolverine habitat and thus the risk of disturbance to wolverine populations. The net effect of these proposals to wolverines would be to reduce cumulative effects to wolverines a small amount.

Activities on Private and State Land

Almost all private and state lands in the Bitterroot drainage are at lower elevations outside the distribution of predicted wolverine habitat. Activities on these lower elevation lands pose little if any risk of impacting wolverines. Exceptions include several patented mining claims along both sides of the Sapphire Divide about 3 miles east of the Chain of Lakes, and one parcel of another patented mining claim near Crystal Point at the head of a tributary of Rye Creek. Minimal mining activity occurs on these claims, but recreational cabins have been constructed on several of them. Some unquantified amount of summer and/or fall recreational use occurs on or near these mining claims in association with these cabins, which increases the risk of disturbance or poaching impacts to wolverines to some extent.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to wolverines by reducing over-snow and wheeled motorized access to parts of the Forest that are predicted wolverine habitat. This in turn would reduce the risk of human-caused disturbance or mortality to wolverines. Cumulative effects to wolverines from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to wolverines because it would not change existing motorized access. All of the above listed present and reasonably foreseeable actions could have cumulative effects on wolverines, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would increase cumulative effects to wolverines by increasing over-snow and wheeled motorized access to small parts of the Forest that are predicted wolverine habitat. This in turn would increase the risk of human-caused disturbance or mortality to wolverines. Cumulative effects to wolverines from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this incrementally-increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to wolverines by reducing over-snow and wheeled motorized access to large parts of the Forest that are predicted wolverine habitat. This in turn would reduce the risk of human-caused disturbance or mortality to wolverines. Cumulative effects to wolverines from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to wolverines by reducing over-snow and wheeled motorized access to parts of the Forest that are predicted wolverine habitat. This in turn would reduce the risk of human-caused disturbance or mortality to wolverines. Alternative 2 would not change the existing level of cumulative effects to wolverines because it would not change existing motorized access. Alternative 3 would increase cumulative effects to wolverines by increasing over-snow and wheeled motorized access to parts of the Forest that are predicted wolverine habitat. This in turn would increase the risk of human-caused disturbance or mortality to wolverines.

Trends and Broader Context

The wolverine is one of the rarest and least-known mammals in North America (Aubry et al. 2007). Since the 1800s, dramatic contractions have occurred within the historical range of the wolverine in the contiguous United States. Although the species once occurred in California, Utah, Colorado, and the Great Lakes states, its current range in the lower 48 states is limited to north-central Washington, northern and central Idaho, western Montana, and northwestern Wyoming (Ruggiero et al. 2007).

Wolverines in the western United States and the interior Columbia basin occur widely at very low densities, but only in northwestern Montana are wolverine populations considered to be healthy and thriving (Witmer et al. 1998). Historical wolverine populations in the contiguous U.S. were extirpated by the early 20th century (McKelvey et al. 2014). In Montana, the wolverine was thought nearly extinct by 1920 from over-trapping (Newby and Wright 1955). Dispersal from Canada appears to have been responsible for re-establishing wolverine populations in Montana beginning in the mid-1930s (*Ibid*), as well as in other areas of the contiguous U.S. (McKelvey et al. 2014). Wolverine numbers increased in the western, mountainous region of Montana from 1950 to 1980 (Hornocker and Hash 1981), presumably as a result of reduced trapping seasons on other furbearers and increased dispersals from Canada. Isolated reports from the Bitterroot Range in 1948 and 1952 probably represented dispersing individuals (Newby and Wright 1955). Hornocker and Hash (1981) concluded that in Montana, extensive wilderness habitat, coupled with more restrictive furbearer harvest regulations, should provide secure wolverine populations in the foreseeable future.

Today, FWP classifies the wolverine as a Montana Species of Concern. The Montana Natural Heritage Program and FWP rank the wolverine as a G4 S3 species (Montana FWP 2015). This means that across its range the species is considered uncommon but not rare (although it may be rare in parts of its range), and usually widespread. It is apparently not vulnerable across most of its range, but there is possibly cause for long- term concern. In Montana, the species is considered potentially at risk because of limited and potentially declining numbers, extent, and /or habitat, even though it may be abundant in some areas.

Montana is the only state in the lower 48 that still allows limited trapping of wolverines, although wolverine trapping during the 2012-2013 trapping season was prohibited by a state district court temporary restraining order. The wolverine trapping season has remained closed, and the allowable quota for number of trapped wolverines remains at zero animals at least through the 2014-2015 season. Montana Fish, Wildlife & Parks' trapping records indicate that between 1996 and 2003, trappers harvested an annual average of 14.4 wolverines throughout Montana, 1.25 within FWP Region 2, and 0.5 within Ravalli County {Project File document WILD-079.pdf}. From 2004 through 2010, trappers harvested an annual average of 7.3 wolverines throughout Montana, 1.6 within FWP Region 2, and 0.6 within Ravalli County {Project File document WILD-080.pdf}. Trappers removed a total of 166 wolverines from Montana between 1996 and 2010 {Project File documents WILD-079.pdf and 080.pdf}, and a total of 15 wolverines from the Bitterroot drainage between 1975 and 2010, including two in 2005 and one in 2010 {Project File document WILD-062.pdf}. The recent decrease in the number of wolverines harvested in Montana may reflect reductions in the trapping quota that occurred in 2008. Prior to the closure of the 2012-2013 wolverine trapping season, FWP trapping regulations allowed a harvest of 5 wolverines annually across Montana, with sub-quotas by Wolverine Management Unit (WMU). The sub-quota was 1 wolverine per year from WMU 2, which includes all of Ravalli County and portions of Granite, Missoula, Powell, Deer Lodge, Silverbow, Beaverhead, and Mineral Counties {Project File document WILD-081.pdf}.

Effects Determination

Alternative 1

Alternative 1 would prohibit motorized access to wolverine habitat in several remote areas that contain predicted wolverine maternal habitat, including the Blue Joint Recommended Wilderness, other recommended wilderness areas in the Bitterroot Mountains, and parts of the Stony Mountain IRA and the Sapphire WSA in the Sapphire Mountains. This would reduce cumulative effects to wolverines from disturbance and incidental trapping to some extent. While such reduction in motorized access would be positive for wolverines, motorized access in wolverine habitat would still be permitted in areas such as the Sapphire and Blue Joint WSAs and the Allan Mountain IRA. Activities proposed under **Alternative 1** would not affect the rate of climate change, which is considered to be the primary threat to wolverines. As a result, the effects call for **Alternative 1** for wolverines is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 2

Implementation of **Alternative 2** would not jeopardize wolverine populations or habitat because it would not change the existing condition for motorized access to wolverine habitat. Activities proposed under **Alternative 2** would not affect the rate of climate change, which is considered to be the primary threat to wolverines. Cumulative impacts resulting from previous management actions would continue.

Alternative 3

Implementation of **Alternative 3** would increase motorized access to wolverine habitat by a small amount from the existing condition during both summer and winter. This would increase cumulative effects to wolverines from disturbance and incidental trapping slightly. Activities proposed under **Alternative 3** would not affect the rate of climate change, which is considered to be the primary threat to wolverines. As a result, the effects call for **Alternative 3** for wolverines is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 4

Alternative 4 would prohibit motorized access to wolverine habitat in many remote areas that contain predicted wolverine denning habitat, including the Blue Joint Recommended Wilderness, other recommended wilderness areas in the Bitterroot Mountains, the Blue Joint and Sapphire WSAs, and the Stony Mountain and Allan Mountain IRAs. This would substantially reduce cumulative effects to wolverines from disturbance and incidental trapping. While such reduction in motorized access would be strongly positive for wolverines, motorized access in some wolverine habitat would still be permitted in areas such as the Skalkaho Basin and upper Lost Horse Creek. Activities proposed under **Alternative 4** would not affect the rate of climate change, which is considered to be the primary threat to wolverines. As a result, the effects call for **Alternative 4** for wolverines is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

F. Fisher (*Martes pennanti*) (Sensitive)

Legal Status

On April 15, 2010, the U.S. Fish and Wildlife Service (USFWS) published a 90-day finding on a petition to list the Northern Rocky Mountain Distinct Population Segment (DPS) of the fisher as an endangered or threatened species under the Endangered Species Act (ESA) (USDI Fish and Wildlife Service 2010a). The USFWS found that the petition presented substantial scientific information indicating that the Northern Rocky Mountains DPS of the fisher may warrant federal protection as a threatened or endangered species. With this notice, USFWS initiated a review of the status of the fisher to determine whether federal listing of this DPS of the fisher was warranted.

On June 30, 2011, USFWS published a 12-month finding on a petition to list the Northern Rocky Mountain DPS of the fisher as an endangered or threatened species under the ISA (USDI Fish and Wildlife Service 2011). The USFWS found that listing the Northern Rocky Mountain DPS of the fisher as threatened or endangered is not warranted at this time (*Ibid*). Fishers continue to be classified as a Sensitive species by the USFS Northern Region.

Effects Analysis Methods

A recent scientific study (Olson et al. 2014) modeled and mapped the distribution of probable fisher occurrence in northern Idaho and western Montana. The fisher analysis will determine the number of miles of roads and trails in modeled fisher habitat that are open to motorized vehicles during the summer because motorized use in these areas has a higher likelihood of causing disturbance impacts to fishers. In addition, since fishers are susceptible to trapping during the furbearer season (December 1 to February 15), and trapper access to many areas is facilitated by over-snow vehicles, the fisher analysis will determine the acreage and percent of modeled fisher habitat open to such use during the winter.

Affected Environment

Fishers are medium-sized members of the weasel family. Fishers are uncommon on the Bitterroot National Forest, but studies, sightings and trapping records indicate that they are well distributed in the Bitterroot Mountains, and probably occupy most of the large canyons in that range. The Bitterroot region appears to be the stronghold of fisher populations in Montana (Vinkey 2003). There have been few verified records of fishers in the Sapphires since 1989, and researchers have been unable to verify the presence of a self-sustaining population in this area (*Ibid*). University of Montana mammologist Dr. Kerry Foresman considers the Sapphire Mountains to be generally too dry for fishers, and has been unable to locate any on the east side of the Bitterroot Valley (K. Foresman , pers. comm. 2006). Recent Bitterroot National Forest and FWP surveys using hair snare methodologies support the premise that fishers on the BNF are largely confined to the Bitterroot Range (see fisher Cumulative Effects section for additional details).

Olson et al. (2014) found that fisher distribution within northern Idaho and western Montana is characterized by drainages or valleys with riparian-type habitat, tall trees, higher mean annual precipitation, and mid-range winter temperatures. Fishers appear to prefer wetter, milder climates (*Ibid*). Other studies have also found that drainage bottoms with riparian coniferous forests/mesic forest types appear to be preferred habitat for fisher and marten (Buskirk and Powell 1994, Heinemeyer and Jones 1994, Powell and Zielinski 1994). Optimum habitat for fishers is thought to include mature, moist coniferous forest with a substantial woody debris component, particularly in riparian/forest ecotones in low-to-mid-elevation areas that do not accumulate large amounts of snow (Jones 1991, Heinemeyer 1993, Powell and Zielinski 1994). A review of fisher research suggests that the species uses a diversity of tree age and size class distributions at the patch or stand level that provide sufficient (generally greater than 40%) overhead cover.

The distribution of fishers appears to be limited by deep snowfall (Krohn et al. 1997; Krohn et al. 1995). Fishers tend to use lower elevations than pine marten (i.e. are restricted to areas of lower snow accumulation compared with marten) and are better adapted to earlier successional stages of forests than marten (Banci 1989, Jones 1991). Several recent studies modeled fisher habitat in the northern Rocky Mountains based on large numbers of actual fisher locations from fishers wearing satellite GPS collars (Sauder and Rachlow 2014), radio collars (Schwartz et al. 2013) or from fisher hair collected at non-invasive hair-snares (Olson et al. 2014). These studies agreed that the probability of fisher occurrence is highest when habitat at both the home range and landscape scales contains mesic forests dominated by large, mature trees, and that fishers tend to select against areas with openings and early seral species such as ponderosa pine. Earlier studies conducted in this region concluded that fishers use late successional forest more frequently than the early-to-mid-successional forests that result from timber harvest (Aubry and Houston 1992, Buck et al. 1994, Rosenberg and Raphael 1986). Similarly, fishers in a Rocky Mountain study preferred late-successional forests with complex physical structure, especially during the summer (Jones and Garton 1994). Fishers seem to avoid non-forest and pole/sapling stands, and spend little time in ponderosa pine stands. Documented den sites have occurred in cavities of live or dead trees in forested areas with some structural diversity (forb/shrub cover, downed wood, multiple forest canopy layers) that maintain a prey base of snowshoe hare, porcupine, and a variety of small mammals (Powell and Zielinski 1994).

There is little, if any, scientific literature that addresses the impacts of motorized recreation to fishers. The fisher is usually characterized as a species that avoids humans (Douglas and Strickland 1987), and tends to be more common in areas where the density of humans is low and human disturbance is reduced (Powell and Zielinski 1994). Johnson and Todd (1985) described several anecdotal observations of fishers using areas near roads that received moderate traffic, and concluded that fishers appear to be less sensitive to human disturbance than is commonly thought. Zielinski et al. (2008) found that OHV use on two study sites in California did not appear to affect marten occupancy, probability of detection, percentage of nocturnal activity, or sex ratios compared to areas without OHV use. Impacts of motorized recreation to fishers may be similar to martens, since the two species share many behavioral and life history traits and occupy similar niches in slightly different habitats. Claar et al. (1999) concluded that fisher are susceptible to habitat fragmentation and population isolation, and that certain recreational activities, as well as poorly placed roads and trails, may contribute to these impacts. Zielinski et al. (2008) agreed with this assessment, but stated that the level of OHV use on their study sites did not affect occupancy for marten, and therefore did not appear to be contributing to fragmentation. Again, these conclusions may apply to fisher given the similarities of the species.

The fisher's apparent preference for mature, moist coniferous forests, combined with a restriction to areas of lower snow accumulation, indicates that fisher habitat on the Bitterroot National Forest is most likely to occur near larger streams at lower elevations. The latest scientific estimate of the distribution of fisher habitat in the northern Rockies comes from Olson et al. (2014). They modeled fisher habitat based on a suite of vegetative, topographic, and climatic variables potentially important to fisher distribution, and also considered fisher occurrence records. They found that high-quality fisher habitat with a moderate or high probability of fisher occurrence was rather limited on the BNF. High quality fisher habitat appears to be distributed in many of the canyon bottoms draining the Bitterroot Mountains. High and moderate quality fisher habitat also is distributed in a reasonably continuous band at lower elevations generally near the Forest boundary on the west side of the valley from McClain Creek south to Owings Creek, and along the West Fork and Nez Perce Creek and their major tributaries. Smaller amounts of high and moderate quality fisher habitat are distributed along Skalkaho Creek, Willow Creek and the Burnt Fork, as well as patches in upper

Ambrose and Threemile Creeks. Fisher habitat with a low probability of fisher occurrence is distributed along the East Fork and in a band along the Forest boundary for much of the rest of the Forest. The majority of the BNF is classified as non-habitat for fishers {Project File document WILD-177.pdf}. Therefore, potential impacts to fisher from motorized recreation are most likely to occur in areas where roads or trails are within riparian corridors, or at low elevations near the Forest boundary.

Table 3.5-12 displays the miles of roads and trails within fisher habitat modeled by Olson et al. (2014) across the Bitterroot National Forest that are currently open to motorized use during the summer {Project File document WILD-183.pdf}.

Table 3.5- 12: Miles of Roads and Trails Open to Motorized Use in Fisher Habitat on the BNF (MT portion)

Miles Open Road Within:	**Existing Condition**
Low Probability Fisher Habitat	544.8
Moderate Probability Fisher Habitat	198.3
High Probability Fisher Habitat	80.4
Total Fisher Habitat	823.5
Miles Open Trail Within:	**Existing Condition**
Low Probability Fisher Habitat	272.0
Miles Open Trail Within:	**Existing Condition**
Moderate Probability Fisher Habitat	97.2
High Probability Fisher Habitat	28.0
Total Fisher Habitat	397.2

Human impacts to fishers have largely occurred through trapping or forest management that affects fisher habitat. Commercial logging often reduces habitat features such as large trees, snags, logs, and overhead cover that are important components of quality fisher habitat. Fishers are known to be highly vulnerable to trapping, and are susceptible to overharvest (Powell 1979), and are sometimes taken in traps intended for marten and other species even in areas where fisher harvest is prohibited. Claar et al. (1999) stated that roads and trails increase vulnerability of wolverine, fisher, and marten to trapping mortality, and that refugia (landscapes such as wilderness or back-country areas that are not subject to trapping) are necessary for the long-term persistence of forest carnivore populations. Trappers tend to use motorized vehicles during the 12/01-02/15 trapping season to access habitat on the Forest likely to contain furbearers. Therefore, the area of the Forest open to over-snow vehicles has some bearing on the risk of trapping mortality to furbearers like fishers.

Table 3.5-13 displays the acreage and percentage of fisher habitat modeled by Olson et al. (2014) within the Montana portion of the Forest open to over-snow vehicles during the fur trapping season {Project File document WILD-178.pdf}:

Table 3.5- 13: Acres and Percentage of Fisher Habitat on the BNF (MT Portion) Open to Over-snow Vehicles

Acres and (%) Open to Over-snow Vehicles Within:	Existing Condition
Low Probability Fisher Habitat	131,941 (49.3%)
Moderate Probability Fisher Habitat	37,480 (50.1%)
High Probability Fisher Habitat	14,148 (40.7%)
Total Fisher Habitat	183,569 (48.7%)

Direct and Indirect Effects

Summer

Table 3.5-14 displays the miles of roads and trails within fisher habitat modeled by Olson et al. (2014) across the Bitterroot National Forest that would be open to motorized during the summer under the alternatives {Project File document WILD-183.pdf}:

Table 3.5- 14: Miles of Roads and Trails Open to Motorized Use within Fisher Habitat on the BNF (Montana portion)

Miles Open Road Within:	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Low Probability Fisher Habitat	528.1	544.8	543.6	370.2
Moderate Probability Fisher Habitat	191.4	198.3	196.1	126.9
High Probability Fisher Habitat	74.8	80.4	79.9	53.2
Total Fisher Habitat	794.3	823.5	819.6	550.3
Miles Open Trail Within:				
Low Probability Fisher Habitat	204.6	272.0	273.7	32.3
Moderate Probability Fisher Habitat	62.0	97.2	87.9	4.5
High Probability Fisher Habitat	21.3	28.0	29.0	1.0
Total Fisher Habitat	287.9	397.2	390.6	37.8

Effects Common to All Action Alternatives

None of the alternatives would change existing fisher habitat conditions in terms of the vegetative components that exist on the landscape because almost all routes already exist on the ground. Several short sections of proposed new motorized trail are included in one or more of the alternatives, but these are on or near ridges in the Sapphire Mountains, and are unlikely to provide suitable habitat for fishers. The environmental effects of constructing these new trail segments would be analyzed in future NEPA documents.

Alternative 1

Alternative 1 would reduce the total length of roads open to summer motorized use within fisher habitat modeled by Olson et al. (2014)   by about 29.2 miles. Drainages where proposed road closures could be especially beneficial to fishers based on the length of road closed within modeled fisher habitat include Threemile Creek, the Burnt Fork, and Overwhich Creek {Project File document WILD-184.pdf}.

Alternative 1 would reduce the total length of trails open to summer motorized use within fisher habitat modeled by Olson et al. (2014) by about 109.3 miles. Many of the trail miles within modeled fisher habitat that would be closed are located in recommended wilderness, the Sapphire WSA, and the Stony Mountain IRA. Potentially important fisher habitat in these areas includes the riparian corridors along Blue Joint, Sheephead, Chaffin, Bear, and Kootenai Creeks, the Burnt Fork, and Gold Creek, as well as the riparian corridors along Warm Springs and Piquett, Creeks {Project File document WILD-184.pdf}.

Alternative 2

Alternative 2 would not reduce the potential for human disturbance to fishers during the summer because it would not change existing motorized access in modeled fisher habitat.

Alternative 3

Alternative 3 would decrease the total length of roads open to summer motorized use within fisher habitat modeled by Olson et al. (2014) by about 3.9 miles. Drainages where proposed road closures could be especially beneficial to fishers based on the length of road closed within modeled fisher habitat include Threemile Creek, the Burnt Fork, and Overwhich Creek {Project File document WILD-186.pdf}.

Alternative 3 would open some trails in modeled fisher habitat that are currently closed, and would close other trails in modeled fisher habitat that are currently open. The net effect of these changes would be to reduce the total length of trails open to summer motorized use within fisher habitat modeled by Olson et al. (2014) by about 6.6 miles. Most of the currently-closed trail miles within fisher habitat that would be opened to motorized use are located in recommended wilderness areas, and include the non-wilderness portions of Bass, Blodgett, Sawtooth, South Lost Horse, Mill, Tin Cup, Trapper, Boulder, and Watchtower Creek trails {Project File document WILD-186.df}. All of these drainages contain potentially important fisher habitat. Allowing motorized use of these trails could increase the risk of disturbance to fishers within them to some extent.

Alternative 3 would also close other trails in fisher habitat that are currently open to motorized use, such as lower Kootenai Creek and Sawdust Creek. Prohibiting motorized use on these trails would reduce the risk of disturbance to fishers within these drainages. At first glance, the overall net reduction in trail miles open to motorized use within fisher habitat would seem to benefit fishers. However, many of the currently closed trails within fisher habitat that would be opened to motorized use traverse higher quality fisher habitat than do many of the currently open trails within fisher habitat that would be closed to motorized use. As a result, the overall effect of this net reduction of trail miles open to motorized use within fisher habitat may actually be somewhat negative for fishers.

Alternative 4

Alternative 4 would reduce the total length of roads open to summer motorized use within fisher habitat modeled by Olson et al. (2014) by about 273.2 miles. Drainages where proposed road closures could be especially beneficial to fishers based on the length of road closed within modeled fisher habitat, include Threemile Creek, the Burnt Fork, Willow Creek, Skalkaho Creek, upper Sleeping Child Creek, the Martin/Brush/Moose Creek complex, Meadow Creek, Mine Creek, Woods Creek, Soda Springs Creek, Overwhich Creek, Trapper Creek, and Chaffin Creek {Project File document WILD-187.pdf}.

Alternative 4 would reduce the total length of trails open to summer motorized use within fisher habitat modeled by Olson et al. (2014) by about 359.4 miles. Many of the trail miles in modeled fisher habitat that would be closed are located in recommended wilderness areas, the Sapphire and Blue Joint WSAs, and the Stony Mountain, Sleeping Child, and Allan Mountain IRAs. Potentially-important fisher habitat in these areas includes those mentioned above under **Alternative 1**. Additionally, **Alternative 4** would prohibit motorized use on trails in potentially important fisher habitat along Deer, Overwhich, Skalkaho, Sleeping Child, and Willow Creeks {Project File document WILD-187.pdf}.

Over-snow

Table 3.5-15 displays the acreage and percentage of the Montana portion of the Forest open to over-snow vehicles during the fisher trapping season {Project File document WILD-178.pdf}:

Table 3.5- 15: Acres and Percentage of the Fisher Habitat on the BNF (MT portion) Open to Over-snow Vehicles

Acres and (%) open to Over-snow Vehicles within:	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Low Probability Fisher Habitat	111,373 (41.6%)	131,941 (49.3%)	133,157 (49.7%)	92,819 (34.7%)
Moderate Probability Fisher Habitat	33,188 (44.4%)	37,480 (50.1%)	37,794 (50.5%)	29,495 (39.4%)
High Probability Fisher Habitat	12,111 (34.9%)	14,148 (40.7%)	14,159 (40.8%)	9,188 (26.5%)
Total Fisher Habitat	156,672 (41.5%)	183,569 (48.7%)	185,110 (49.1%)	131,502 (34.9%)

Alternative 1

Alternative 1 would reduce the area of modeled fisher habitat open to over-snow vehicle use on the Montana portion of the Forest by about 26,897 acres during the winter, including the fisher trapping season. Most of the areas where over-snow vehicle use would be prohibited are in recommended wilderness areas, the north half of the Sapphire WSA, the section of the Blue Joint WSA south of the Castle Rock – Bare Cone Ridge, the Stony Mountain IRA, and some sections of the Selway-Bitterroot IRA (See Alternative 1 Winter Map on CD)s. While most of the area that would be closed to over-snow vehicles is at high elevations, and is thus not likely to provide suitable fisher habitat, these areas contain several riparian corridors that may provide fisher habitat, such as upper Blue Joint Creek, lower Sheephead and Watchtower Creeks, a large part of Blodgett Creek, the lower parts of many other canyons draining the Bitterroot Mountains, upper Skalkaho Creek and the Burnt Fork {Project File document WILD-179.pdf}. Reducing motorized access to these drainages may reduce the risk of trapping mortality for fishers.

Overall, **Alternative 1** would reduce the risk of disturbance or trapping mortality to fisher in some areas of the Forest that provide suitable fisher habitat. It would not affect the physical structure of fisher habitat. The net effect from reducing motorized access to local fisher habitat and populations under **Alternative 1** would be positive for fishers.

Alternative 2

Alternative 2 would continue the existing condition for over-snow vehicle access across the Forest. Currently, such use is allowed on approximately 183,569 acres of modeled fisher habitat on the Montana portion of the Forest (48.7% of modeled fisher habitat) during the winter, including the fisher trapping season. Overall, the risk of disturbance or trapping mortality to fisher would remain at existing levels.

Alternative 3

Alternative 3 would increase the area of modeled fisher habitat open to over-snow vehicle use on the Montana portion of the Forest by about 1,541 acres during the winter, including the fisher trapping season. The areas where such use would be newly-allowed are in two existing elk winter range closures (See Alternative 3 Winter Map on CD). One of these straddles Road #969 in the head of Little Willow and Birch Creeks, and provides mostly low-quality fisher habitat... The other area encompasses the area between Canyon Creek and the top of Romney Ridge, from the Forest boundary west to the Selway-Bitterroot Wilderness boundary {Project File document WILD-

181.pdf}. The trail runs through the riparian corridor along Canyon Creek, and would provide over-snow vehicle access to almost 2 miles of good fisher habitat that is currently closed to such use. This new access might increase the risk of fisher mortality due to trapping along Canyon Creek, both inside and outside the Wilderness.

Overall, **Alternative 3** would increase the risk of disturbance or trapping mortality to fishers in some areas of the Forest that provide suitable fisher habitat. It would not affect the physical structure of fisher habitat. The net effect from increasing motorized access to local fisher habitat and populations under **Alternative 3** would be somewhat negative for fishers.

Alternative 4

Alternative 4 would reduce the area of modeled fisher habitat open to over-snow vehicle use on the Montana portion of the Forest by about 52,067 acres during the winter, including the fisher trapping season. Most of the areas where such use would be prohibited are in recommended wilderness, the Sapphire and Blue Joint WSAs, the Stony Mountain and Allan Mountain IRAs, and large portions of the Selway-Bitterroot IRA (See Alternative 4 Winter Map on CD). While most of the area that would be closed to over-snow vehicles is at high elevations and is thus not likely to provide suitable fisher habitat, these areas contain several riparian corridors that may provide fisher habitat, such as those along upper Blue Joint Creek, lower Sheephead, Watchtower and Fales Creeks, upper Warm Springs Creek, a large part of Blodgett Creek, the lower parts of many other canyons draining the Bitterroot Mountains, Sleeping Child Creek, upper Skalkaho Creek and the Burnt Fork {Project File document WILD-182} . Reducing access to these drainages may reduce the risk of trapping mortality for fishers.

Overall, **Alternative 4** would reduce the risk of disturbance or trapping mortality to fishers in many areas of the Forest that provide suitable fisher habitat. It would not affect the physical structure of fisher habitat. The net effect from reducing motorized access to local fisher habitat and populations under **Alternative 4** would be strongly positive for fishers.

Summary of Direct and Indirect Effects to Fishers

Alternative 1 would reduce the risk of human-caused disturbance and trapping mortality to fishers somewhat more than **Alternatives 2 and 3**, but less than **Alternative 4**. **Alternative 3** would increase the risk of human-caused disturbance and trapping mortality to fishers slightly from **Alternative 2,** but more than **Alternative 1,** and much more than **Alternative 4**. **Alternative 4** would reduce the risk of human-caused disturbance and trapping mortality to fishers somewhat more than **Alternative 1**, but substantially more than either **Alternatives 2 or 3**.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for fishers is the Bitterroot National Forest and adjacent forested areas that provide potential fisher habitat on the Lolo, Beaverhead-Deerlodge, Salmon-Challis, and Clearwater-Nez Perce National Forests. This analysis area is appropriate to analyze any incremental effects from the actions of this project on this species in combination with past, present (ongoing), and reasonably foreseeable activities because implementing travel management decisions on the Forest would have negligible effects to fishers in more distant areas. Fishers in the Bitterroot National Forest portion of the Bitterroot Mountains are likely part of a larger population that also inhabits the Idaho side of the range, but most fisher habitat on both sides is within the Selway-Bitterroot Wilderness, the Frank Church - River of No Return Wilderness, or in adjacent areas of recommended wilderness or roadless areas where motorized use is prohibited or limited.. Evidence of fishers in the Bitterroot National Forest portion of the Sapphires is very limited, but larger, relatively unroaded drainages where fishers are more likely to occur on the Bitterroot side of the Sapphires are generally adjacent to unroaded areas on the other side of the Sapphires. An assessment of information available at larger scales is considered to provide additional context.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for fishers, which are described in the Affected Environment section, above.

The impacts of travel management changes proposed in this FEIS are analyzed in the Direct and Indirect Effects section. Appendix A to the FEIS describes past, present and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to fishers.

Many forest activities have little effect on fisher populations, because:

- Ø The activity does not occur in fisher habitat;
- Ø The activity's disturbance is too small to produce an effect;
- Ø Project design features are applied to reduce the activity's effects to negligible levels;
- Ø The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to fisher populations include:

- Ø Prescribed burning
- Ø Invasive Plants Management
- Ø Cattle Grazing
- Ø Personal use Christmas tree harvesting
- Ø Special Uses/Permits (including Outfitter and Guide Activity)
- Ø Activities on Private and State Land

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Fire Suppression

The amount of suitable fisher habitat may have increased since the early 1900s on the Bitterroot National Forest and surrounding areas, as fire suppression has allowed a widespread increase in distribution and density of conifers, including the proliferation of Douglas-fir on sites that were formerly maintained in ponderosa pine by frequent, low-intensity fires. Fire suppression has also allowed more mature and old growth forests to develop at mid-to-upper elevations than was usual under historic fire regimes (Gallant et al. 2003). However, these denser forest conditions also increased the risk of the large, high-intensity fires that have become common across the western United States since the late 1980s. These severe fires may eliminate suitable fisher habitat in burned areas for many years, and may reduce fisher populations across portions of the landscape.

Fire suppression activities in themselves have a negligible effect on fisher populations.

Road and Trail Management

The road system constructed largely to facilitate timber harvest increased summer and winter human access to fisher habitat, which increased the risk of fisher mortality due to trapping, poaching, or vehicle impacts to a considerable extent. Many early road systems were constructed in creek bottoms, which tend to contain the best fisher habitat. Locating road systems in high quality fisher habitat reduced the amount of closed canopy forest in these locations, and also improved trapper access to fisher populations. The combination of habitat loss and increased human access to fisher habitat likely reduced fisher populations in roaded drainages. Subsequent road closures have reduced access to many upland areas that are not particularly good fisher habitat. However, roads in stream bottoms tend to be main roads that typically remain open because they lead to extensive road systems and/or recreational facilities. Therefore, most previous road closures have not reduced disturbance or trapping pressure for fisher in prime fisher habitat.

Projects that close additional miles of roads, such as the Martin Creek Watershed Restoration Project, Lower West Fork, Trapper Bunkhouse, and the Darby Lumber Lands Watershed Improvement and Travel Management Project, would tend to reduce disturbance and mortality risks to fishers by limiting vehicle access to potential fisher habitat. These sorts of projects would have a positive effect to fishers in both the short and long terms.

Personal Use Firewood Cutting

Firewood cutting is a popular activity on the Bitterroot National Forest along roads that are open to full sized vehicles for at least part of the year. Firewood cutting appears to have increased during the latest economic downturn. Firewood cutting removes snags and logs that fishers often use for resting and denning sites, especially if they contain cavities. Harvesting snags and logs also reduces the amount of down logs on the forest floor, which provide favored foraging sites for fishers to hunt small mammals. Firewood cutting along roads in creek bottoms may reduce or eliminate these important habitat components for fishers, which could in turn reduce the area's carrying capacity for fishers. Firewood cutting along roads in more xeric upland situations may have little effect on fishers. Firewood cutting is prohibited within 150 feet of streams, but many riparian areas along larger creeks are wider than that. Road closures and specific firewood cutting closures along some larger streams have reduced the potential impacts of firewood cutting to fishers along creek bottoms like the Burnt Fork and Lost Horse Creek. However, most roads in larger creek bottoms remain open to firewood cutting as long as they are more than 150 feet from the stream.

Public Use

The growing use of over-snow vehicles over the past several decades has increased access for trappers to many areas of high-quality fisher habitat along streams. This increased access likely increased the risk of fisher mortality from trappers. Over-snow vehicle access also increased the risk of disturbing fishers during the denning season, which may have impacted fisher productivity. Motorized access was prohibited in Designated Wilderness by the Wilderness Act in 1964. Motorized access to portions of the Bitterroot National Forest was further restricted in a number of elk winter ranges by area closures established prior to implementation of the Forest Plan in 1987, and some of these closures also benefited fishers by reducing the risk of disturbance in fisher habitat. No areas open to over-snow vehicle use have been closed since the Forest Plan was signed, so access for trapping has remained relatively unchanged since that time. Use of over-snow vehicles outside of these restricted areas has become more common as the number of users has increased and the capability of the machines has improved. Increased amount and distribution of such use has increased the risk of impacts to fishers, especially in lower-to-mid elevation riparian habitats.

Timber Harvest, Prescribed Burning, and Associated Activities

Past timber management reduced mature canopy cover, course woody debris, and snags across the landscape, all of which are important to fishers. Forestry practices changed in the 1980s to retain course woody debris and snags in units. Fishers may be vulnerable to fragmentation of habitat, similar to marten (Hargis et al.1999), so past timber harvest that created hard edges and large openings may have negatively affected fisher habitat.

Timber harvest and/or prescribed burning in ongoing or reasonably foreseeable timber sales and ecoburns such as the Three Saddle Vegetation Management Project, the Como Forest Health Protection project, and the Cameron Blue Ecoburn may impact existing fisher habitat to some extent by reducing the canopy closure and understory complexity within treatment units, although riparian buffers would protect most of the high quality fisher habitat along streams. However, the long-term benefits of reducing fire risk, limiting tree mortality to insect outbreaks, and accelerating growth of remaining trees may produce higher quality fisher habitat in treatment units in the future. Many harvest proposals also include some road closures, some of which would reduce motorized access to fisher habitat and thus the risk of disturbance to fisher populations. The net effect of these types of proposals to fishers would be neutral-to-somewhat negative in the short term, but positive in the longer term.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to fishers by reducing over-snow and wheeled motorized access to parts of the Forest that are fisher habitat. This in turn would reduce the risk of human-caused disturbance or mortality to fishers. Cumulative effects to fishers from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to fishers because it would not change existing motorized access. All of the above listed present and reasonably foreseeable actions could have cumulative effects on fishers, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would increase cumulative effects to fishers by increasing over-snow and wheeled motorized access to parts of the Forest that are fisher habitat. This in turn would increase the risk of human-caused disturbance or mortality to fishers. Cumulative effects to fishers from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to fishers by reducing over-snow and wheeled motorized access to parts of the Forest that are fisher habitat. This in turn would reduce the risk of human-caused disturbance or mortality to fishers. Cumulative effects to fishers from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to fishers by reducing over-snow and wheeled motorized access to parts of the Forest that are fisher habitat. This in turn would reduce the risk of human-caused disturbance or mortality to fishers. **Alternative 2** would not change the existing level of cumulative effects to fishers because it would not change existing motorized access. **Alternative 3** would increase cumulative effects to fishers by increasing over-snow and wheeled motorized access to parts of the Forest that are fisher habitat. This in turn would increase the risk of human-caused disturbance or mortality to fishers.

Trends and Broader Context

Montana Fish, Wildlife & Parks classifies the fisher as a Montana Species of Concern. The Montana Natural Heritage Program and FWP rank the fisher as a G5 S3 species (Montana FWP 2015). This means that across its range the species is considered common, widespread, and abundant (although it may be rare in parts of its range). It is not vulnerable in most of its range. In Montana, the species is considered potentially at risk because of limited and potentially declining numbers, extent and /or habitat, even though it may be abundant in some areas.

Witmer et al. (1998) stated that the status of the fisher in the western United States is poorly known but generally perceived as precarious and declining. Fisher populations in all the other states (except Montana) in the northern Rocky Mountains and Pacific Northwest are considered Imperiled, Critically Imperiled, or Possibly Extirpated (NatureServe 2012). Fishers are apparently secure in their core range, which includes the boreal forest zone across Canada (*Ibid*).

Fishers were apparently extirpated from Montana by 1930, and there are no records of their occurrence in the state from then until fishers from other areas were released at several sites in the early 1960s (Vinkey 2003; Vinkey et al. 2006). The Bitterroot region possesses the most verified records of fishers in the State, both before and after 1989, and appears to be the stronghold of fisher populations in Montana (Vinkey 2003). This is largely due to a release of 42 fishers from British Columbia in the Selway-Bitterroot region in 1962 and 1963 (Vinkey et al 2006). However, recent genetic investigations indicate that some native fishers may have survived in the Selway-Bitterroot region based on the presence of individuals that carry a haplotype unique to fishers native to the Northern Rocky Mountains (Vinkey 2003; Vinkey et al. 2006; Schwartz 2007). Twelve fishers from British Columbia were released at Moose Lake on the eastern edge of the Sapphire Mountains in 1960 (Weckwerth and Wright 1968), and apparently became established in the Sapphires based on trapping records. One of these fishers was killed in a trap in the Skalkaho Creek drainage on the Bitterroot National Forest in 1965 (*Ibid*). Although fishers in Montana and Idaho have increased in numbers and distribution since their perceived extirpation in the 1920s, little is known about the population numbers, trends, or vital rates of fishers in this area today (USDI Fish and Wildlife Service 2011).

Fishers are known to be highly vulnerable to trapping and susceptible to overharvest (Powell 1979). Montana is the only state in the western United States that still allows limited trapping of fishers. Montana Fish, Wildlife & Parks' trapping records indicate that between 1996 and 2003, the average number of fishers taken by trappers annually was 7.6 across Montana, 6.5 within FWP Region 2, and 2.6 within Ravalli County {Project File document WILD-079.pdf}. From 2004 through 2010, the average number of fishers taken by trappers annually was 7 across Montana, 5.7 in FWP Region 2, and 2.7 within Ravalli County {Project File document WILD-080.pdf}. Trappers removed a total of 110 fishers from Montana between 1996 and 2010, and a total of 63 fishers from Ravalli County between 1975 and 2010 {Project File document WILD-062.pdf}. Most of these trapped fishers appear to have come from drainages with at least some road access (*Ibid*). The current FWP trapping regulations allow a quota of 7 fishers per year statewide, with a female sub-quota of 2. FWP District 2, which includes Ravalli and Granite Counties and portions of Missoula, Powell, Deerlodge, Lewis and Clark, and Mineral Counties, has a quota of 5 fishers annually {Project File document WILD-081.pdf}.

The Forest participated in a Regional pilot study designed to determine fisher presence within 25 square mile grid cells in 2007, 2008, 2009, 2010.2012 and 2013. The survey methodology is based on baited hair snares that are left in suitable fisher habitat for three weeks. Hairs collected from animals that attempt to reach the bait are then sent to the Genetics Lab at the Rocky Mountain Research Station facility on the University of Montana campus for identification. Surveys performed by Forest personnel in 2013 sampled fisher habitat in the upper West Fork, the upper East Fork and in the Selway River drainage in Idaho. No fishers were detected, although a number of marten were detected {Project File documents WILD-190.pdf and WILD-191.pdf}. Surveys in 2012 sampled fisher habitat in Deep Creek (Selway River drainage), several tributaries entering Nez Perce Creek from the north, Mine Creek, Willow Creek and Butterfly Creek. A fisher was detected in Deep Creek, but none were detected in the other areas {Project File documents WILD-174.pdf and WILD-175.pdf}. Surveys in 2010 sampled fisher habitat in several tributaries of Nez Perce Creek and in several tributaries entering both sides of the East Fork Bitterroot River near the end of the East Fork Road. No fishers were detected {Project File document WILD-176.pdf}. Surveys in 2009 sampled several tributaries on both sides of the West Fork Bitterroot River. No fishers were detected {Project File document FPMON-035.pdf}. However, the Region also contracted with FWP to conduct fisher surveys using this methodology in 2009. Montana Fish, Wildlife & Parks' surveys identified two fishers in the Lost Horse drainage in 2009 (*Ibid*). In 2008, this survey methodology identified one fisher in Trapper Creek, one fisher in Bear Creek, and one fisher in a tributary of Nez Perce Creek. No fishers were detected in Lost Horse Creek, Roaring Lion Creek, upper Skalkaho Creek, or Woods Creek (*Ibid*). In 2007, one fisher was detected in the Burnt Fork drainage, but no fishers were detected in Willow Creek, Daly Creek, Sleeping Child Creek, Moose Creek, Meadow Creek, Mine Creek, Coal Creek, or Soda Springs Creek (*Ibid*).

A Bitterroot National Forest hydrologist saw a fisher in the Sheafman Creek drainage in 2011. A Bitterroot National Forest wilderness ranger spotted a fisher near Nez Perce Creek in 2009 {Project File document FPMON-035.pdf}. A wildlife biologist spotted a fisher while hiking in the Larry Creek area in 2006 (*Ibid*). Observers conducting pine marten track surveys found a set of fisher tracks in the Lost Horse Creek drainage in 2004 (*Ibid*). Foresman and Pearson (1998) photographed fishers in the Big Creek and Bear Creek drainages during a study in the winter of 1994-1995. Foresman (pers. comm.) feels that most of the Bitterroot canyons support fisher populations.

At a Forest-wide scale, a query of Forest Inventory Analysis data estimated there are approximately 95,134 acres of summer fisher habitat and 286,142 acres of winter fisher habitat. This is 95 percent of the habitat necessary to maintain a minimum viable population of fisher (Samson 2005, Samson 2006). The adjacent Lolo National Forest and Clearwater National Forest have an estimated 149 percent and 358 percent, respectively, of the habitat necessary to maintain a minimum viable population (Samson 2005). Several large wildfires on the Bitterroot National Forest in recent years may have reduced the amount of suitable fisher habitat, especially in the Skalkaho and Sleeping Child drainages in the Sapphire Mountains, and in the Allan Mountain IRA.

Effects Determination

See the biological evaluation/assessment Summary (Section 3.5.8) for documentation of the effects determinations for fishers under these alternatives.

Alternative 1

Alternative 1 would prohibit motorized wheeled access to high-quality fisher habitat along riparian corridors in the Blue Joint Recommended Wilderness, recommended additions to the Selway-Bitterroot Wilderness in the Bitterroot Mountains, and the Stony Mountain IRA in the Sapphire Mountains. In addition, it would prohibit over-snow vehicle access to most of these areas, which would reduce the risk of trapping mortality. This would reduce cumulative effects to fishers to some extent. While such reductions in motorized access would be positive for fishers, motorized access in fisher habitat would still be permitted in areas such as portions of the Sapphire and Blue Joint WSAs and the Sleeping Child and Allan Mountain IRAs. As a result, the effects call for **Alternative 1** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 2

Implementation of **Alternative 2** would have No Impact to fisher populations or habitat because it would not change the existing condition for motorized access to fisher habitat. Cumulative impacts resulting from previous management actions would continue.

Alternative 3

Implementation of **Alternative 3** would increase motorized access to fisher habitat by a small amount from the existing condition, both in summer and winter. It may increase the risk of disturbance slightly, and may also increase the risk of trapping mortality to fishers slightly in the Canyon Creek drainage. This would add to cumulative effects to fishers to some extent. However, fisher harvest quotas are set and enforced by FWP, so a slightly-increased risk of trapping mortality for fishers should not result in overharvest. As a result, the effects determination for **Alternative 3** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 4

Alternative 4 would prohibit motorized wheeled access to high-quality fisher habitat along riparian corridors in the Blue Joint Recommended Wilderness, recommended additions to the Selway-Bitterroot Wilderness in the Bitterroot Mountains, the Blue Joint and Sapphire WSAs, and the Stony Mountain and Allan Mountain IRAs in the Sapphire Mountains. In addition, it would prohibit over-snow vehicle access to the same areas, which would reduce the risk of trapping mortality. This would substantially reduce cumulative effects to fishers. While such reductions in motorized access would be strongly positive for fishers, motorized access in fisher habitat would still be permitted in some areas, As a result, the effects call for **Alternative 4** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

G. Western Toad (*Bufo boreas*) (Sensitive)

Effects Analysis Method

Western toads are also commonly known as boreal toads. The analysis for western toads will focus on:

- Potential effects to riparian areas (miles of open motorized routes within 100’ of streams, lakes or ponds)
- Potential for direct mortality caused by motorized vehicles in terrestrial habitats (miles of open motorized routes regardless of proximity to water)

Affected Environment

Western toads are habitat generalists that are found in a variety of habitats from valley bottoms to high elevations. They breed in lakes, ponds, and slow streams with a preference for shallow areas with mud bottoms. Breeding season varies with elevation, but typically occurs soon after ice has left a particular site. Tadpoles are seen in ponds during the day. Adult toads may migrate to over wintering sites, which may be chambers associated with streams or spring seeps or more commonly, rodent burrows deep enough to prevent freezing and having soil moisture high enough to prevent desiccation {Project File document WILD-016.pdf}. In one recent study in northeastern Oregon, toads were mainly terrestrial outside of the breeding season, and used vegetation types, areas of burning and harvest activities, and a variety of slope steepness in proportion to their availability on the landscape. However, toads selected south-facing slopes and avoided north-facing slopes compared to random plots. Toads used areas with no trees and seedlings more, and used older stands less than expected based on availability. They also occurred in openings >15 meters in diameter more than expected based on availability (Bull 2006). In another recent study in southeastern Idaho, western toads selected open forests and sapling stands over either closed forests or recent clearcuts, and selected areas close to patch edges. They also selected habitats with more protective cover, such as shrubs, logs, or rodent burrows (Bartelt et al. 2004).

Several recent studies used radio telemetry to track the movements of radio-marked toads through the active season. In by far the largest of these studies, Bull (2006) found that the majority of western toads in her five study sites in eastern Oregon left their breeding ponds and traveled in a relatively straight line from the breeding site to small, mostly upland home ranges where they remained for the rest of the summer. Females typically left the breeding site 1 or 2 days after egg laying, while males remained at the breeding site for 1 to 4 weeks. Breeding occurs within days after the ice melts on lakes and ponds (*Ibid*), which implies that most toads have moved away from breeding sites before those sites can be easily accessed by humans. Females in this study traveled significantly farther from the breeding site (mean = 2543 meters, n = 27) than males (mean = 997 m, n = 28). 67% of females and 14% of males moved > 2000 meters from their breeding site. After breeding, toads were primarily terrestrial. Toad locations during the summer were closer to water compared to random plots, although the mean distance of toad locations to water was 46 meters. Males tended to stay closer to water than females.

Bartelt et al. (2004) also found that western toads used terrestrial habitats disproportionate to habitat availability at their study site in southeastern Idaho. Their toads also left the breeding site following egg-laying, with females traveling farther from the breeding site (mean = 1105 m, n = 8) than males (mean = 581 m, n = 10).

Muths (2003) agreed that female toads travel farther from the breeding site (mean = 721 m, n = 6) than males (mean = 218 m, n = 8) in one drainage in Rocky Mountain National Park in Colorado, but did not quantify habitat characteristics at toad locations or comment on the prevalence of terrestrial habitat use. In Muths' study area, 92% of toad locations were within 700 meters of the breeding site.

In a study in western Montana that did not use radio telemetry to locate toads, but instead used in-stream weirs to capture them, Adams et al. (2005) stated that western toads do occur along the edges of rivers and streams. They found that toads make frequent home range movements in streams, and documented movements using streams as long as 1.5 km. and movement rates greater than 500 meters/day. They did not attempt to correlate toad locations with habitat characteristics, and did not look for toads in terrestrial habitats.

Breeding sites in lakes or ponds are obviously critical for western toads, but there is little indication in the literature that riparian habitats are particularly important for this species outside of the late spring/early summer breeding season. Although Bull (2006) found that toad locations during the summer were closer to water compared to random plots, the mean distance of toad locations to water was 46 meters. This is well outside the relatively narrow riparian zones found along most streams, lakes and ponds on the Forest.

Based on these studies, the effects analysis for western toads in the FEIS will focus on the number of miles of motorized roads and trails within a buffer zone around ponds and lakes that are potential toad breeding sites instead of quantifying how many acres of riparian habitat are impacted by roads and trails, as suggested in a comment received in response to the DEIS. Motorized wheeled access for dispersed camping is unlikely to impact breeding toads to any extent, since the breeding season is usually shortly after ponds and lakes thaw in the spring. Few campers are out this early in the year, and many riparian areas near potential breeding sites are inaccessible due to snowpack and/or seasonal closures.

A large percentage of the streams on the Forest have very narrow riparian zones associated with them, and these studies generally indicate that most toads are located in terrestrial habitats during most of the active season. However, the toad analysis in the FEIS will compare the number of miles of roads and trails open to motorized use within 100 feet of streams because of the finding in Bull (2006) that toads tend to occur closer to water than expected from random plots. This buffer will also incorporate much of the riparian habitat on the Forest.

Western toads appear to be attracted to recently disturbed areas and may benefit from fuel reduction projects. Toads colonized and bred in dozens of shallow ponds in burned forests in Glacier National Park, but not in adjacent unburned areas (Pilliod et al. 2006). Diet samples from western toads in burned subalpine fir and lodgepole pine forests in northeast Oregon contained higher numbers of prey items than samples obtained from toads in unburned forests, although the numbers were not statistically different (Bull 2006).

Individual western toads may be injured or killed by vehicles when crossing roads or trails, especially when dispersing from breeding areas. Toads are also at risk of being killed by vehicles because they often select road surfaces for foraging during the night (Hailman 1984). Maxell (2004) suggested that vehicle traffic on roads near some toad breeding sites may represent the greatest threat to populations at those sites. The potential for direct mortality to toads from motor vehicles is probably directly related to the number of miles of roads and trails open to motorized use, since toads are largely terrestrial and use a variety of habitats that are often a considerable distance from water. Therefore, the number of miles of roads and trails open to motorized use can be used as an index of the risk for toad mortality from motorized use.

Inventories conducted in 2001 through 2003 as part of a Region-wide effort found evidence of western toads breeding in several ponds across the Bitterroot National Forest, but no evidence of breeding in numerous other apparently suitable ponds (Maxell 2004). Sites on the Bitterroot National Forest where evidence of breeding was detected during this survey included Kramis Pond, and the adjacent shoreline area of Lake Como, Little Rock Creek Lake, several small ponds in the Lick Creek drainage, Lost Trail Bog, a seep and pond near the old vermiculite mine in the Saint Clair Creek drainage, and several ponds in the Little Blue Joint Creek drainage. In addition, Forest personnel have documented evidence of breeding in small ponds within the road prism of the White Stallion road (Road #1392) that are fed by seeps in the cut bank. Heavy recreational use of the roads, campsites, and beaches at Kramis Pond and the Lake Como area, traffic and dispersed camping near Little Blue Joint Creek, use of the parking lot at Lost Trail ski area near Lost Trail Bog, and seasonal ATV and motorcycle use of White Stallion Road #1392 may increase the risk of disturbance or mortality to toads in those areas. The other known western toad breeding sites are not near motorized routes.

There are now only 60 reported records for western toads in the Bitterroot drainage dating back to 1939. Across this time period there has only been evidence for breeding reported at 16 lentic (still water) sites in the drainage. Monitoring of water bodies at and near these localities was initiated in 2001. Thirteen of these sites were found to have breeding activity in 2001-2003, one site had been destroyed, and two seemed unlikely to ever support breeding activity. Several of the 13 localities with breeding activity are in close proximity to one another. Thus, only eight clusters of breeding activity are currently known in the Bitterroot drainage (Maxell 2004). Only five of these clusters are on Bitterroot National Forest lands.

In seeming contrast to the official records, it is not uncommon to see toads on Forest roads at night, and casual observations seem to indicate that toads are reasonably well-distributed across the Bitterroot drainage. The entire Forest provides suitable habitat for western toads given their use of a variety of habitats, although use may be limited in many of the denser stands on north-facing slopes (Bull 2006).

Table 3.5-16 displays the existing condition for miles of roads and trails open to motorized use within 100 feet of streams across the Forest {Project File folder 'fisheries,' Project File document FISH-003.pdf}.

Table 3.5- 16: Miles of Roads and Trails Open to Motorized Use within 100 Feet of Streams

	Miles of Open Roads Within 100 Feet of Streams	Miles of Open Trails Within 100 Feet of Streams
Existing Condition	57	69

Table 3.5-17 displays the existing condition for miles of roads and trails open to motorized use within 100 feet of lakes and ponds across the Forest {Project File document WILD-089.pdf}.

Table 3.5- 17: Miles of Roads and Trails Open to Motorized Use within 100 Feet of Lakes and Ponds

	Miles of Open Roads Within 100' of Lakes and Ponds	Miles of Open Trails Within 100' of Lakes and Ponds
Existing Condition	1.0	0.4

Table 3.5-18 displays the miles of roads and trails open to motorized use during the summer across the Forest regardless of their proximity to water (Chapter 2, Table 2-21):

Table 3.5- 18: Miles of Roads and Trails Open to Motorized Use on the Bitterroot National Forest

	Miles of Roads Open to Motorized Use	Miles of Trails Open to Motorized Use	Total Miles of Routes Open to Motorized Use
Existing Condition	1,533	1,068	2,601

Direct and Indirect Effects

Summer

Effects Common to All Action Alternatives

All of the action alternatives would prohibit motorized wheeled access for dispersed camping within 30 feet of any flowing stream, pond, lake, marsh, or wetland. This would protect riparian habitat and water quality in potential toad breeding sites, as well as reduce the risk of direct mortality to breeding adults, eggs, or immature toads that could result from motorized vehicles crossing these wet areas.

Table 3.5-19 displays the miles of roads and trails open to motorized use within 100 feet of streams across the Forest by alternative {Project File folder ‘fisheries,’ Project File document FISH-003.pdf :

Table 3.5- 19: Miles of Roads and Trails Open to Motorized Use within 100 Feet of Streams

	Miles of Open Roads Within 100 Feet of Streams	Miles of Open Trails Within 100 Feet of Streams
Alternative 1	54	34
Alternative 2	57	69
Alternative 3	57	74
Alternative 4	24	1

Table 3.5-20 displays the miles of roads and trails open to motorized use within 100 feet of lakes and ponds across the Forest by alternative {Project File document WILD-089.pdf}:

Table 3.5- 20: Miles of Roads and Trails Open to Motorized Use within 100 Feet of Lakes and Ponds

	Miles of Open Roads Within 100 Feet of Lakes and Ponds	Miles of Open Trails Within 100 Feet of Lakes and Ponds
Alternative 1	1.0	0.2
Alternative 2	1.0	0.4
Alternative 3	1.0	0.5
Alternative 4	0.8	0.0

Table 3.5-21 displays the miles of roads and trails open to motorized use during the summer across the Forest, regardless of their proximity to water, by alternative (Chapter 2, Table 2-21).

Table 3.5- 21: Miles of Roads and Trails Open to Motorized Use on the BNF

Alternative	Miles of Roads Open to Motorized Use	Miles of Double-track Trails Open to Motorized Use	Miles of Single-track Trails Open to Motorized Use	Total Miles of Routes Open to Motorized Use
Alternative 1	1,483	605	205	2,293
Alternative 2	1,533	660	408	2,601
Alternative 3	1,527	679	477	2,683
Alternative 4	1,081	126	16	1,223

Alternative 1

Alternative 1 would reduce the risk of direct mortality from motorized vehicles to toads that may be concentrated near potential breeding sites by prohibiting motorized use on about 0.2 miles of trails within 100 feet of lakes and ponds (Table 3.5-20), and 2.6 miles of roads and 35.3 miles of trails within 100 feet of streams (Table 3.5-19). It would not restrict motorized use of roads or trails within 100 feet of any of the toad breeding sites documented by Maxell (2004), but would prohibit motorized use on about 0.5 miles of Road #74111 that are currently open to seasonal ATV use in the vicinity of breeding areas near Little Blue Joint Creek. It would extend the existing seasonal closure for ATVs on Road #1392 to include the archery hunting season, which could reduce the risk of ATV impacts to tadpoles or recently metamorphosed small toads in or near ponds on the road surface. However, the road would still be open to ATV use during the breeding season and the early to mid-summer period when tadpoles are developing.

Table 3.5-21 shows that **Alternative 1** would reduce the risk of direct mortality from motorized vehicles to toads using road and trail prisms across the Forest by prohibiting motorized use on about 50 miles of roads, 55 miles of motorized double-track trails, and 199 miles of motorized single-track trail. Toads would no longer be at risk of being run over and killed by motorized vehicles on these routes, but would continue to be at risk on routes that remained open to motorized use. Additional road and trail closures might also reduce impacts to potential toad breeding sites comprised of seasonally or perennially wet areas on road or trail surfaces, but any such benefits would be minor and are not quantifiable. **Alternative 1** would reduce the risk of toad mortality due to vehicle impacts to some extent.

Alternative 2

Alternative 2 would not reduce the risk of direct mortality to toads on existing roads and motorized trails because it would not decrease the road and trail miles open for motorized use. Toads would continue to be at risk of being run over and killed by motorized vehicles on these routes. **Alternative 2** would not change existing impacts to breeding or terrestrial habitats for toads.

Alternative 3

Alternative 3 would increase the risk of direct mortality from motorized vehicles to toads that may be concentrated near potential breeding sites by allowing motorized use on about 0.1 miles of trails within 100 feet of lakes and ponds (Table 3.5-20), and 4.2 miles of trails within 100 feet of streams (Table 3.5-19) where such use is currently prohibited. However, it would also reduce the risk of direct mortality near potential breeding sites by prohibiting motorized use on about 0.3 miles of currently open roads within 100' of streams (Table 3.5-15). It would not restrict use of any motorized roads or trails in the immediate vicinity of any of the toad breeding sites documented by Maxell (2004).

Table 3.5-21 shows that **this alternative** would reduce the risk of direct mortality from motorized vehicles to toads using road prisms across the Forest by prohibiting motorized use on about 6 miles of roads that are currently open to such use. At the same time, **Alternative 3** would also increase the risk of direct mortality to toads on trails by allowing motorized use on about 19 miles of double-track trails, and 69 miles of single-track trail where such use is currently prohibited (Table 3.5-21). Toads would continue to be at risk of being run over and killed by motorized vehicles on routes that remain open to motorized use. Permitting motorized use on additional miles of trails might also increase impacts to potential toad breeding sites comprised of seasonally or perennially wet areas on trail surfaces, but any such impacts would be minor and are not quantifiable. **Alternative 3** would be the only alternative that would increase the risk of toad mortality due to vehicle impacts.

Alternative 4

Alternative 4 would reduce the risk of direct mortality from motorized vehicles to toads that may be concentrated near potential breeding sites by prohibiting motorized use on about 0.2 miles of roads and 0.4 miles of trail within 100 feet of lakes and ponds (Table 3.5-20), and 1.5 miles of roads and 63.1 miles of trails within 100 feet of streams (Table 3.5-19). It would not restrict motorized use of roads or trails within 100 feet of any of the toad breeding sites documented by Maxell (2004), but would prohibit motorized use on about 3.7 miles of several roads (#7411, #74112, and #74113) that are currently open to seasonal ATV use in the vicinity of breeding areas near Little Blue Joint Creek. It would extend the existing seasonal closure for ATVs on Road #1392 to a year-round closure, which would eliminate the risk of ATV impacts to tadpoles or recently metamorphosed toadlets in or near ponds on about 8.5 miles of road surface.

Table 3.5-21 shows that **Alternative 4** would reduce the risk of direct mortality to toads by eliminating motorized use on about 452 miles of roads, 534 miles of motorized double-track trails, and 392 miles of motorized single-track trail. Toads would no longer be at risk of being run over and killed by motorized vehicles on these routes, but would continue to be at risk on routes that remained open to motorized use. Additional road and trail closures might also reduce impacts to potential toad breeding sites comprised of seasonally or perennially wet areas on road or trail surfaces, but any such benefits would be modest and are not quantifiable. **Alternative 4** would reduce the risk of toad mortality due to vehicle impacts more than any of the other alternatives.

Over-snow

All Alternatives

None of the alternatives, including **Alternative 2 (No Action),** would have any direct or indirect effects to western toads during the winter. Adult toads overwinter underground in natural holes, crevasses, or rodent burrows that are deep enough to prevent freezing and retain soil moisture high enough to prevent desiccation {Project File document WILD-016.pdf}. These types of sites are not vulnerable to impacts from over-snow vehicles or from wheeled vehicles on roads or trails, so motorized activities during the winter would not affect hibernating toads.

Summary of Direct and Indirect Effects to Western Toads

Alternative 1 would reduce the risk of motorized impacts to riparian habitats and the risk of direct mortality to toads caused by vehicles somewhat more than **Alternatives 2 or 3**, but substantially less than **Alternative 4**. **Alternative 3** would increase the risk of motorized impacts to riparian habitats and the risk of direct mortality to toads caused by vehicles slightly compared to **Alternative 2**, somewhat more that **Alternative 1**, and substantially more than **Alternative 4**. **Alternative 4** would reduce the risk of motorized impacts to riparian habitats and the risk of direct mortality to toads caused by vehicles substantially more than **Alternatives 2 or 3**, and somewhat more than **Alternative 1**.

Cumulative Effects

Geographic Boundary

The defined cumulative effects analysis area for the western toad is the Bitterroot River drainage. This is a reasonable size to analyze effects because western toad movements and home ranges for adult toads range from approximately 440 yards to at least 1,750 yards from breeding sites {Project File document WILD-017.pdf}. Impacts of implementing travel management decisions on the Bitterroot National Forest would be negligible to toad populations in adjacent drainages. A regional assessment of population trends is also considered to provide additional context.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for the western toad, which is described in the Affected Environment section, above.

The impacts of travel management activities proposed in this FEIS are analyzed in the Direct and Indirect Effects section. Appendix A to the FEIS describes past, present, and reasonably foreseeable activities which, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to western toads.

Many forest activities have little effect on toad populations, because:

- The activity occurs during the winter when toads are hibernating underground;
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to western toad populations include:

- Personal use firewood cutting
- Personal use Christmas tree harvesting
- Special Uses/Permits (including Outfitter and Guide Activity)

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Past timber harvest, road construction and maintenance, road side herbicide spraying, cattle grazing, conversion of native habitats during residential and business development, and fire suppression have affected western toad habitat in the Bitterroot drainage, but the extent of these habitat impacts to local toad populations is not known.

Fire Suppression

Bull (2006) found that western toads prefer open areas or forested areas with open canopies for terrestrial habitat following the breeding season. The amount of these preferred habitats may have decreased since the early 1900s, as fire suppression has allowed a widespread increase in distribution and density of conifers, including the widespread proliferation of Douglas-fir on sites that were formerly maintained in ponderosa pine by frequent, low-intensity fires. Fire suppression has also allowed more mature and old growth forests to develop at mid-to-upper elevations than was usual under historic fire regimes (Gallant et al. 2003). An increase in closed forest canopies may have resulted in reduced toad numbers. The increase in the amount of acres burned by wildfires since the 1980s has reversed the trend towards closed canopy forests to some extent, which may have improved habitat conditions for toads.

Fire suppression activities may impact toads in localized areas. Heavy equipment used to construct or rehabilitate fire lines causes an unknown amount of toad mortality, as doe’s fire traffic on roads and trails. Fire retardant chemicals used during aerial suppression efforts could kill or injure toads, although the existence or extent of such impacts is unknown. Fire suppression activities on the Bitterroot National Forest and surrounding National Forests have increased since the 1980s as large fires have become more common.

Timber Harvest, Prescribed Burning, and Associated Activities

Prescribed burning may kill or injure toads that are within the area when it is burned. The extent of toad mortality or injuries is unknown, but may be somewhat limited by the timing of prescribed burning, which often occurs in the spring or fall. Prescribed burning may produce long term benefits to toads by creating more open canopies and understories that toads appear to prefer.

The Darby Lumber Lands Watershed Improvement and Travel Management Project, included road closure that reduces cumulative effects to toads by reducing the risk of mortality from vehicle impacts. Vegetation management projects such as the Three Saddle Vegetation Management Project and the Como Forest Health Protection project that reduce canopy closure and create small openings would benefit toads.

Invasive Plant Management

Herbicides used to control invasive plants may injure or kill toads that are exposed to sufficient concentrations of chemicals. Herbicides used on the Bitterroot National Forest are generally applied along roads or trails using truck-mounted nozzles or backpack sprayers, but are also applied to larger grasslands via helicopter or ATV. Since toads are habitat generalists that prefer more open habitats, some are likely to be present in these areas when herbicides are applied, with unknown consequences.

Road and Trail Management

The road system constructed largely to facilitate timber harvest impacted riparian areas in some drainages due to road locations near creeks or through wetlands. The road system also increased the risk of toad mortality due to vehicle impacts. Increasing motor vehicle use of trails in recent years has added to this risk. This trend has been offset to some extent by the road closures implemented since 1987 that were largely intended to meet the elk habitat effectiveness standard in the Forest Plan. Some closed roads have developed ephemeral or permanent ponds within the road prism or in roadside drainage ditches, and these may provide breeding sites for toads that may not have existed prior to road construction. The Forest does not have an inventory of potential toad breeding sites on closed roads, but has documented western toad tadpoles in ponds on at least one road (Road #1392) that is closed year-round to full-sized vehicles. In general, activities that include road or trail closures to motorized vehicles would reduce cumulative effects to toads by reducing the risk of mortality from vehicle impacts.

Cattle Grazing

At least one episode of over one thousand recently metamorphosed toads apparently being trampled by cows near a breeding pond on private land has been reported (Maxell 2004). Cattle on National Forest System lands grazing allotments are attracted to water, which is the only habitat where toads breed. It is possible that cows sometimes trample toads in the vicinity of other breeding ponds, but the frequency and extent of these potential impacts is unknown.

Activities on Private and State Land

Management activities on state lands in the Bitterroot drainage are similar to management activities on the Bitterroot National Forest, and may have similar impacts to toads. The extent of any such impacts is unknown.

No known breeding ponds have been destroyed on Bitterroot National Forest lands, but some known or potential breeding ponds on private lands have been filled in (Maxell 2004). An unknown number of toads are killed by traffic on roads that cross private land.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to toads by reducing motorized access to some roads and trails near potential toad breeding sites, as well as on roads and trails crossing upland toad summer range. This in turn would reduce the risk of human-caused mortality and disturbance to toads. Cumulative effects to toads from the above listed present and reasonably foreseeable would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to toads because it would not change existing motorized access near potential toad breeding sites or in upland toad summer range. All of the above listed present and reasonably foreseeable actions could have cumulative effects on western toads, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would reduce the miles of roads open to motorized use near potential toad breeding sites and in upland summer range slightly, while increasing the miles of trails open to motorized use in these areas. On balance, this alternative would increase cumulative effects to toads to some extent. Cumulative effects to toads from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly increase level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to toads by reducing motorized access to some roads and trails near potential toad breeding sites, as well as on roads and trails crossing upland toad summer range. This in turn would reduce the risk of human-caused mortality and disturbance to toads. Cumulative effects to toads from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to toads by reducing motorized access to some roads and trails near potential toad breeding sites, and on routes crossing upland summer range. This in turn would reduce the risk of human-caused mortality and disturbance to toads. Alternative 2 would not change the existing level of cumulative effects to toads because it would not change existing motorized access near potential toad breeding sites or in upland summer range. Alternative 3 would reduce the miles of roads open to motorized use near potential toad breeding sites and in upland summer range slightly, while increasing the miles of trails open to motorized use in these areas. On balance, this alternative would increase cumulative effects to toads to some extent.

Trends and Broader Context

Montana Fish, Wildlife & Parks classifies the western toad as a Montana Species of Concern. The Montana Natural Heritage Program lists the western toad as a G4 S2 species (Montana FWP 2015). Range wide, this means that the species is considered uncommon, but not rare (although it may be rare in parts of its range), and usually widespread.

On the state scale, the species is at risk because of very limited and potentially declining numbers, extent and/or habitat, making it vulnerable to extirpation in the state. Populations of western toads have declined in many parts of their range, including the central Rocky Mountains, California's Central Valley, northern Utah, and the northern Great Basin. Declines in national parks and wilderness areas, however, indicate that direct anthropogenic influences are not likely causing these declines {Project File document WILD-018.pdf}. Some of these declines have been associated with bacterial and fungal infections such as *Batrachochytrium dendrobatidis*, a pathogenic Chytrid fungus that has been found in western toads collected at the National Elk Refuge near Jackson Hole, Wyoming but that has not been detected in Montana to date (Maxell 2004). Reasons for other declines are unknown, but may include acid precipitation, increased UV light, and climate change (Bull 2006).

According to historic accounts, the western toad was once considered common or abundant in western Montana. Surveys in the late 1990s showed that western toads were absent from a large number of their historic localities in the northern Rocky Mountains, and that although they were still widespread across the landscape, they occupied an extremely small proportion of suitable habitat (summarized in Maxell 2000). Surveys of more than 2,000 water bodies in western Montana since 1997 have found breeding populations at less than 5 percent of the sites {Project File document WILD-019.pdf}. Thus, the evidence to date suggests that western toads underwent a decline in the 1980s, and are now either in the process of recovering, or are continuing to decline because populations are small, isolated, and/or subject to other risk factors (Maxell 2000).

Western toad populations appear to be declining regionally. Maxell (2004) reported that western toads were still found to be widespread in the region (detected in 50 percent of watersheds and breeding detected in 17 percent of watersheds). Of the lentic (still water) sites surveyed, western toads were detected at 5.5 percent of wet lentic sites, and were breeding at only 2.8 percent of the wet lentic sites (Maxell 2004).

Recent evidence from Glacier National Park has linked western toads with wildfire. Some researchers are investigating whether forest encroachment into meadows, facilitated by fire suppression and cessation of cattle grazing, reduced the suitability of former breeding sites of a species of frog {Project File document WILD-019.pdf}. The relationship between forest structure and western toad habitat is not understood well enough to predict how the changes in forest structure, mimicking natural densities and species composition, would influence western toads.

Effects Determination

See the biological evaluation/assessment Summary (Section 3.5.8) for documentation of the effects determinations for western toads under these alternatives.

Alternative 1
Alternative 1 would prohibit motorized wheeled access for dispersed camping within 30 feet of any flowing stream, pond, lake, marsh, or wetland. This would protect riparian habitat and water quality in potential toad breeding sites, as well as reduce the risk of direct mortality to breeding adults, eggs, or immature toads that could result from motorized vehicles crossing these wet areas.

Alternative 1 would prohibit motorized use on a small length of roads and trails within 100 feet of lakes and ponds, and several miles of roads and many miles of trails within 100 feet of streams. It would also prohibit motorized use on a moderate number of road and trail miles regardless of their proximity to these features. While such reduction in motorized access would be positive for western toads, a considerable amount of motorized access to roads and trails within and beyond 100 feet of streams, lakes, and ponds would still be permitted under this alternative. Toads would continue to be at risk of direct mortality due to being run over by motorized vehicles, although this risk would be reduced considerably by reducing motorized access to roads and trails. As a result, the effects call for **Alternative 1** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 2 (No Action)
Implementation of **Alternative 2** would have No Impact to western toads, because it would continue the existing level of potential impacts to riparian habitat, and the existing risk of direct mortality to toads due to vehicle collisions on roads and trails open to motorized use. Cumulative impacts resulting from previous management actions would continue.

Alternative 3

Alternative 3 would prohibit motorized wheeled access for dispersed camping within 30 feet of any flowing stream, pond, lake, marsh, or wetland. This would protect riparian habitat and water quality in potential toad breeding sites, as well as reduce the risk of direct mortality to breeding adults, eggs, or immature toads that could result from motorized vehicles crossing these wet areas.

This alternative would increase motorized access to trails within 100 feet of lakes and ponds, trails within 100 feet of streams, and to trails across the Forest in general. It would, however, slightly reduce motorized access to roads within 100 feet of lakes, and across the Forest in general. Overall, these changes in motorized access on roads and trails would add to the cumulative effects of previous activities, and would be slightly negative for western toads. Toads would be at increased risk of direct mortality due to being run over by motorized vehicles, but the amount of increased risk would be relatively small since it would be spread out across large areas of the Forest. As a result, the effects call for **Alternative 3** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 4

Alternative 4 would prohibit motorized wheeled access for dispersed camping within 30 feet of any flowing stream, pond, lake, marsh, or wetland. This would protect riparian habitat and water quality in potential toad breeding sites, as well as reduce the risk of direct mortality to breeding adults, eggs, or immature toads that could result from motorized vehicles crossing these wet areas.

This alternative would prohibit motorized use on small lengths of roads and trails within 100 feet of lakes and ponds, and on a considerable number of road and trail miles within 100 feet of streams. It would also prohibit motorized use on a substantial number of road and trail miles greater than 100 feet from lakes, ponds, and streams. This would reduce cumulative effects of previous activities to toads much more than **Alternatives 1 and 3**. While such large reductions in motorized access would be very positive for western toads, a considerable amount of motorized access to roads and trails within and beyond 100 feet of streams would still be permitted under this alternative. Toads would continue to be at risk of direct mortality due to being run over by motorized vehicles, although this risk would be reduced considerably by reducing motorized access to roads and trails. As a result, the effects call for **Alternative 4** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

H. Bighorn Sheep (*Ovis canadensis*) (Sensitive)

Bighorn sheep were added to the Regional Forester's Sensitive Species List for all National Forests in Region 1 on May 27, 2011 {Project File document WILD-090.pdf}.

Effects Analysis Methods

The analysis of potential impacts to bighorn sheep evaluates the potential for motorized disturbance to sheep using one of several known winter or summer ranges located on Bitterroot National Forest lands.

Affected Environment

Bighorn sheep occur in a variety of habitats, but rough, rocky terrain with steep cliffs in association with meadows or grasslands are required habitat components of both summer and winter range. Although not as agile climbers as the mountain goat, sheep still depend on cliffs and steep hillsides for escape terrain to avoid predators. Bighorns can eat a much broader range of foods and can live in more arid conditions than mountain goats (Foresman 2001).

Bighorn sheep are susceptible to several lung diseases that cause pneumonia-like symptoms and often result in very high mortality rates among infected herds. These disease outbreaks are frequently thought to result from direct contact between bighorn sheep and domestic sheep or goats. There have not been any active sheep allotments on the Bitterroot National Forest for many years, which limits the risk of contact between wild and domestic sheep. However, there are some domestic sheep herds and small bands of sheep and goats on ranches and hobby farms on private land relatively near the Forest boundary in some areas. Bighorn rams have been documented visiting domestic sheep on some of these private operations on occasion, and could potentially transmit diseases from the domestic sheep to wild sheep herds on the Forest.

The distribution of bighorn sheep on the Bitterroot National Forest is currently more limited than any other big-game species, and much apparently suitable habitat on the Forest is unoccupied. As with many big-game species, winter habitat is more limited than summer habitat. Ewes, lambs, and young rams often occupy winter ranges on the Bitterroot National Forest year-round, while mature rams are prone to migrate considerable distances to summer ranges at higher elevations. Montana Fish, Wildlife & Parks' bighorn sheep distribution maps {Project File document WILD-091.pdf} indicate that there are about 282,935 acres of occupied bighorn sheep habitat on the Bitterroot National Forest, of which about 45,009 acres is classified as sheep winter range.

There are currently three distinct bighorn sheep herds on the Bitterroot National Forest. While these herds seem relatively isolated based on their distribution, DeCesare and Pletscher (2006) suggest that distinct populations of bighorn sheep may be more connected than previously known due to the propensity of rams (especially) to travel relatively long distances. Although the majority of documented long distance movements were not during the breeding season, such movements suggest that bighorn sheep may be able to maintain genetic connectivity among sub-populations separated by distances greater than 30 kilometers (*Ibid*).

The East Fork herd occupies historic sheep habitat, but is the result of a reintroduction of 35 sheep in 1972 (Montana FWP 2010). The population had grown to 200 to 250 animals by 2008 (*Ibid*), but was reduced to 85-100 sheep by a pneumonia-like disease (and culling of symptomatic sheep by FWP) during the winter of 2009-10. This herd winters in two areas: the steep southwest-facing slopes between Sula Peak and Robbins Gulch and on the steep, open slopes from west of Bunch Gulch to those east of Jennings Camp Creek. Most ewes, lambs and young rams stay on or near these winter ranges year-round, but mature rams and a few ewe/lamb bands migrate to and summer in the vicinity of the Chain of Lakes in the Sapphire WSA (*Ibid*).

The West Fork herd consists of two largely separate groups. A winter survey in 2006 counted about 120 sheep in the Montana portion of this herd's territory (Montana FWP 2010). The Painted Rocks group is a result of reintroductions in 1990, 1991, and 2004. This group winters mostly on rocky, south-facing bunchgrass slopes north of Painted Rocks Reservoir (*Ibid*). This group tends to stay fairly close to their winter range all year, although some rams migrate to locations in the northern Allan Mountain IRA such as Piquett Mountain and upper Warm Springs Creek during the summer {Project File document WILD-158.pdf}. The Watchtower group is the only fully native bighorn population left in the Bitterroot Valley. Most of this group winters along the Selway River in Idaho, although a few move to the limited winter ranges on lower elevations in Sheephead and Watchtower Creeks (Montana FWP 2010). Summer ranges for the Watchtower bighorns occur near the upper elevations of Watchtower and Sheephead Creeks and along the Montana-Idaho divide toward Nez Perce Pass. Some are found as far east as Little West Fork Creek (*Ibid*). Almost 90 percent of the occupied sheep habitat for this group is in the Selway-Bitterroot Wilderness (*Ibid*). There is some evidence of limited mixing between the Watchtower and Painted Rocks groups (*Ibid*). There is no evidence that either of the groups in this herd has been affected by pneumonia.

The Skalkaho drainage is historic sheep habitat, but sheep had not occupied the area in the recent past until 1973, one year after a reintroduction in the East Fork Bitterroot River (Montana FWP 2010). The Skalkaho herd grew to about 36 sheep in 1999, and was supplemented with 27 animals from the Sun River herd in 2000. There are currently about 130 sheep in the Skalkaho herd (*Ibid*). This group winters mostly in the steep, open cliffy areas between Newton Gulch and Tenderfoot Gulch, and in similar country in the Sleeping Child drainage between Twomile Creek and private land near Brookins Gulch {Project File document WILD-158.pdf}. Ewe/lamb groups tend to stay in or near these areas year-round, while ram groups summer higher in the main drainages in open areas near Gird Point, Railroad Creek, Skalkaho Mountain, and as far away as Burnt Fork Lake (*Ibid*). Montana Fish, Wildlife & Parks personnel removed several of the sheep in this herd that exhibited pneumonia-like symptoms in the summer of 2010, but none of these sheep tested positive for the bacteria that usually cause pneumonia. The cause of the symptoms was not identified, but so far the herd has not been affected by a wide-spread pneumonia outbreak or an obvious decline in numbers.

Montana Fish, Wildlife & Parks issues a very limited number of hunting permits for bighorn sheep in each of these herds. Sporadic reports of sheep have come from lower Lost Horse Creek and from private land in the Threemile Creek drainage, but these are likely to be wandering young rams from established herds in lower Rock Creek and Skalkaho Creek, respectively. There is no evidence that either of these areas currently supports an established sheep population.

Of the ungulate species for which relationships with humans and disturbance have been reported, the bighorn sheep appears to be most susceptible to detrimental effects (Canfield et al. 1999). Berwick (1968) suggested that harassment may be debilitating to winter-stressed sheep. Dunaway (1971) considered disturbance caused by non-motorized human recreation in California wilderness areas to be a factor limiting populations of bighorn sheep in California. Conversely, Hicks and Elder (1979) concluded that non-motorized human use in one of the wilderness areas studied by Dunaway (1971) did not seem to be adversely affecting bighorn sheep despite repeated encounters with humans. MacArthur et al. (1982) found that bighorn sheep in an Alberta wildlife sanctuary exhibited low reactivity to human disturbance so long as it occurred in a known and predictable place and manner. A road passing through the sanctuary was a focal point for human activities, and vehicles on the road or humans on foot hiking from the road caused little reaction from sheep. Humans approaching from less expected directions resulted in greater reactions from sheep. Their data suggested that on sheep range used heavily for recreation, disturbance to sheep may be minimized by restricting human activities to roads and established trail systems. King and Workman (1986) found that behavioral responses of desert bighorn sheep in Utah to encounters with humans were more severe and thus more energy costly for animals that had been previously exposed to relatively high levels of hunting pressure and vehicular traffic. Papouchis et al. (2001) found that desert bighorn sheep in Utah showed a greater avoidance of roads in a high-use area than in a low-use area, and that avoidance of the road corridor reduced the amount of potential useable habitat for sheep.

Bighorn sheep may become habituated to disturbance by vehicles or people on foot if the disturbance is frequent and predictable (Hicks and Elder 1979, MacArthur et al. 1986, Papouchis 2001). Well-known examples of bighorn sheep that are apparently habituated to vehicle disturbance include many of the sheep in the East Fork and Skalkaho herds that are commonly seen licking salt residues or grazing on the road shoulders along Highway 93, the East Fork Road, or the Skalkaho Highway where those roads pass through sheep range. These same sheep may be disturbed by vehicles or humans that appear in other, unexpected locations. A further caution is that overt behavior may be a poor indicator of the stress response of bighorn sheep to human intruders. Sheep that appear to be undisturbed by the presence of humans or vehicles may actually be physiologically stressed (MacArthur et al. 1982).

Although sheep appear to be disturbed by motorized use in many circumstances, there are few recommendations for buffer zones in the scientific literature. The project's wildlife biologist opted to use a ½ mile buffer around roads and trails open to motorized vehicles within or near sheep spring, summer, and fall range to estimate the number of acres and percentage of sheep spring, summer, and fall range that would be outside the zone of motorized influence across the Forest. Table 3.5-22 displays the acres and percentage of bighorn sheep spring, summer, and fall range that are outside the zone of motorized influence defined by this ½ mile buffer around roads and trails open to motorized use {Project File document WILD-092.pdf}.

Table 3.5- 22: Acres and Percent of Bighorn Sheep Summer Range outside the Zone of Motorized Influence

Existing Condition	Acres and (%)
Total Acres Sheep Summer Range on BNF	282,934
Acres and (%) Sheep Summer Range Outside the Zone of Motorized Influence	91,348 (32.3%)

Sheep are also susceptible to disturbance on winter ranges, which are much more limited than summer ranges. Based on the same methodology used for sheep summer range, Table 3.5-23 displays the acres and percentage of sheep winter range that would be outside the zone of motorized influence defined by the ½ mile buffer around open roads and trails {Project File document WILD-092.pdf}. Snow accumulations in most sheep winter ranges are generally inadequate to support over-snow vehicle use, except perhaps on the roads passing through them, which are usually also open to use by wheeled vehicles.

Table 3.5- 23: Acres and Percent of Bighorn Sheep Winter Range outside the Zone of Motorized Influence

Existing Condition	Acres (%)
Total Acres Sheep Winter Range on BNF	45,009
Acres and (%) of Sheep Winter Range Outside the Zone of Motorized Influence	16,397 (36.4%)

Direct and Indirect Effects

Summer

A ½ mile buffer around roads and trails near or in bighorn sheep summer range that would be open to motorized use was used to determine the number of acres and percentage of sheep spring, summer, and fall habitat that would be outside the zone of motorized influence. This assumption allowed for the comparison of the relative effects of the alternatives to sheep, even if the actual buffer width is uncertain. About 27,721 acres (9.8 percent) of occupied sheep summer range on the Forest is in the Selway-Bitterroot Wilderness, and would thus be outside the zone of motorized influence under all alternatives. Table 3.5-24 displays the acres and percentage of bighorn sheep spring, summer and fall range that would be undisturbed by motorized vehicles for each alternative {Project File document WILD-092.pdf}.

Table 3.5- 24: Acres and Percent of Bighorn Sheep Summer Range outside the Zone of Motorized Influence

	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**
Acres and (%) Sheep Summer Range Outside the Zone of Motorized Influence	124,360 (44.0%)	91,348 (32.3%)	89,562 (31.7%)	191,190 (66.5%)

Alternative 1

Alternative 1 would reduce the potential for human disturbance and mortality to bighorn sheep during the summer by reducing human presence in some of the steep, open grassy habitats preferred by sheep for summer range. **Alternative 1** would increase the area of sheep summer habitat that is outside the zone of motorized influence by about 33,012 acres (Table 3.5-24). This alternative would prohibit motorized use on trails in sheep summer range in the Chain of Lakes area of the southern Sapphire WSA, the upper Warm Springs Creek and upper Piquett Creek areas in the Allan Mountain IRA, the northern part of the Blue Joint Recommended Wilderness, and the Sheephead Creek drainage near the southern boundary of the Selway-Bitterroot Wilderness {Project file document WILD-093.pdf}. This would benefit sheep by reducing potential human disturbance on summer range in these areas. Reducing disturbance would lessen the chance for displacing sheep to less suitable habitat, which could increase the risk of predation. It would also reduce the potential for poaching losses to the sheep populations in these areas. This alternative would not affect the vegetative habitat suitability for sheep. The net effect from this combination of factors to local sheep populations is expected to be positive.

Alternative 2

Alternative 2 would not reduce the potential for human disturbance and mortality to bighorn sheep during the summer because it would not change the potential for human disturbance in any of the steep, open grassy habitats preferred by sheep for summer range. The existing motorized access to identified sheep summer range {Project File document WILD-094.pdf} would continue, as would the risk of displacement of sheep to less suitable habitat. It would also continue the existing potential for poaching losses to sheep populations in these areas. This alternative would not affect habitat suitability for sheep. Sheep populations on the Bitterroot National Forest have generally increased with many of the current road and trail restrictions on motorized use in place, so the effect of implementing **Alternative 2** is likely to be neutral.

Alternative 3

Alternative 3 would increase the potential for human disturbance and mortality to bighorn sheep during the summer by allowing motorized use on some trails in some of the steep, open grassy habitats preferred by sheep for summer range. **Alternative 3** would reduce the area of sheep summer habitat that is outside the zone of motorized influence by about 1,786 acres (Table 3.5-24). Areas where motorized access to sheep summer range would increase include an area south of St. Claire Creek and the upper Halford Creek drainage {Project File document WILD-095.pdf}. Increasing disturbance would increase the chance for displacing sheep to less suitable habitat, which could increase the risk of predation. It could also increase the potential for poaching losses to the sheep populations in these areas. This alternative would not reduce vegetative habitat suitability for sheep. The net effect from this combination of factors to local sheep populations is expected to be slightly negative.

Alternative 4

Alternative 4 would reduce the potential for human disturbance and mortality to bighorn sheep during the summer by reducing human presence in many of the steep, open grassy habitats preferred by sheep for summer range. **Alternative 4** would increase the area of sheep summer habitat that is outside the zone of motorized influence by about 99,842 acres (Table 3.5-24). This alternative would prohibit motorized use on trails in sheep summer range in the Chain of Lakes area of the southern Sapphire WSA, the northern part of the Blue Joint Recommended Wilderness, and the Sheephead Creek drainage near the southern boundary of the Selway-Bitterroot Wilderness. It would also prohibit motorized use in the upper Warm Springs Creek and upper Piquett Creek areas in the Allan Mountain IRA, but would add closures on several trails along the main ridge that separates the Warm Springs Creek drainage from the Piquett Creek and Overwhich Creek drainages, including Shook Mountain, Rocky Knob, Medicine Point, and Piquett Mountain {Project File document WILD-096.pdf}. Although summer sheep distribution in the Allan Mountain IRA is not well known, it is likely that this ridge and associated high points provide high-quality habitat for sheep. These closures would benefit sheep by reducing potential human disturbance on summer range in these areas. Reducing disturbance would lessen the chance for displacing sheep to less suitable habitat, which could increase the risk of predation. It would also reduce the potential for poaching losses to the sheep populations in these areas. This alternative would not affect the vegetative habitat suitability for sheep. The net effect from this combination of factors to local sheep populations is expected to be strongly positive.

Over-snow

A ½ mile buffer around roads and trails near or in bighorn sheep winter range that would be open to motorized use was used to determine the number of acres and percentage of sheep winter habitat that would be outside the zone of motorized influence. This assumption allowed for the comparison of the relative effects of the alternatives to sheep, even if the actual buffer width is uncertain. Table 3.5-25 displays the acres and percentage of bighorn sheep winter range that would be undisturbed by motorized vehicles for each alternative {Project File document WILD-092.pdf}.

Table 3.5- 25: Acres and Percent of Bighorn Sheep Winter Range outside the Zone of Motorized Influence

	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**
Acres and (%) Sheep Winter Range Outside the Zone of Motorized Influence	21,766 (48.4%)	16,397 (36.4%)	14,922 (33.2%)	29,915 (66.5%)

Alternative 1

Alternative 1 would reduce the potential for human disturbance and mortality to bighorn sheep during the winter by reducing human presence in some of the steep, open grassy habitats preferred by sheep for winter range. **Alternative 1** would reduce the area of sheep winter range that is within the zone of motorized influence by about 5,370 acres (Table 3.5-25). Most of the increase in acres of sheep winter range outside the zone of motorized influence would be in the lower Sheephead Creek drainage, the upper elevations of several of the draws west of Elk Point, and in a much smaller area between Shirley Mountain and the East Fork Road {Project File document WILD-097.pdf}. This would benefit sheep by reducing potential human disturbance on winter range in these areas. Reducing disturbance would lessen the chance for displacing sheep to less suitable habitat, which could increase the risk of predation or the chance of contact with domestic sheep. It would also reduce the potential for poaching losses to the sheep populations in these areas. **Alternative 1** would not affect the vegetative habitat suitability for sheep. The net effect from this combination of factors to local sheep populations is expected to be somewhat positive.

Alternative 2

This alternative would not reduce the potential for human disturbance and mortality to bighorn sheep during the winter because it would not change the potential for human disturbance in any of the steep, open grassy habitats preferred by sheep for winter range. The existing motorized access to identified sheep winter range {Project File document WILD-098.pdf} would continue, as would the risk of displacement of sheep to less suitable habitat. It would also continue the existing potential for poaching losses to sheep populations in these areas. This alternative would not affect the vegetative habitat suitability for sheep. Sheep populations on the Bitterroot National Forest have generally increased with many of the current road and trail restrictions on motorized use in place, so the effect of implementing **Alternative 2** is likely to be neutral.

Alternative 3

Alternative 3 would increase the potential for human disturbance and mortality to bighorn sheep during the winter by allowing motorized use on some trails in some of the steep, open grassy habitats preferred by sheep for winter range. **Alternative 3** would increase the area of sheep winter habitat that is within the zone of motorized influence by about 1,475 acres (Table 3.5-25). Areas where motorized access to sheep winter range would increase include a large area in lower Watchtower Creek and a smaller area in several draws west of Elk Point {Project File document WILD-099.pdf}. Increasing disturbance would increase the chance for displacing sheep to less suitable habitat, which could increase the risk of predation or the chance of contact with domestic sheep. It could also increase the potential for poaching losses to the sheep populations in these areas. This alternative would not reduce the vegetative habitat suitability for sheep. The net effect from this combination of factors to local sheep populations is expected to be somewhat negative.

Alternative 4

Alternative 4 would reduce the potential for human disturbance and mortality to bighorn sheep during the winter by reducing human presence in some of the steep, open grassy habitats preferred by sheep for winter range. **Alternative 4** would increase the area of sheep winter habitat that is outside the zone of motorized influence by about 13,518 acres (Table 3.5-25). Almost two-thirds of the winter sheep range on Bitterroot National Forest lands would be protected from motorized disturbance. Increases in acres of sheep winter range outside the zone of motorized influence would occur in the lower Sheephead Creek drainage, portions of the Blue Joint and Little Blue Joint Creek drainages, the area between Slate Creek and Ditch Creek northeast of Painted Rocks Lake, the area from Sula Peak to Medicine Tree Creek, and most of the identified sheep winter range between Badger Gulch and Jennings Camp Creek north of the East Fork Road {Project File document WILD-100.pdf}. These closures would benefit sheep by reducing potential human disturbance on winter range in these areas. Reducing disturbance would lessen the chance for displacing sheep to less suitable habitat, which could increase the risk of predation or the chance of contact with domestic sheep. It would also reduce the potential for poaching losses to the sheep populations in these areas. This alternative would not affect vegetative habitat suitability for sheep. The net effect from this combination of factors to local sheep populations is expected to be more positive than any of the other alternatives.

Summary of Direct and Indirect Effects to Bighorn Sheep

Alternative 1 would reduce the risk of motorized disturbance to bighorn sheep during both summer and winter more than **Alternatives 2 or 3**, but less than **Alternative 4**. **Alternative 3** would increase the risk of motorized disturbance to bighorn sheep during both summer and winter slightly compared to **Alternative 2**, substantially more than **Alternative 1,** and very substantially compared to **Alternative 4**. **Alternative 4** would reduce the risk of motorized disturbance to bighorn sheep during both summer and winter substantially compared to **Alternatives 2 or 3**, and somewhat more than **Alternative 1**.

<u>Cumulative Effects</u>

Geographic Boundaries

The defined cumulative effects analysis area for bighorn sheep is the Bitterroot drainage. This analysis area is appropriate to analyze any incremental effects from the actions of this project on bighorn sheep in combination with past, present, and reasonably foreseeable activities because sheep herds in the Bitterroot drainage are relatively isolated from those in other drainages. The effects of implementing travel management decisions on the Bitterroot National Forest would have negligible effects to sheep herds in more distant areas. The State level consideration is used to provide a broader context for the more localized effects analyzed.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for bighorn sheep, which is described in the Affected Environment section, above.

The impacts of travel management activities proposed in this FEIS are analyzed in the Direct and Indirect Effects section. Appendix A to the FEIS describes past, present, and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to bighorn sheep. Bighorn sheep in the Bitterroot drainage are unique in terms of cumulative effects because most herds were introduced in the recent past. Overall, proposals that reduce motorized access and/or conifer densities in bighorn sheep ranges would reduce cumulative effects to bighorn sheep.

Many forest activities have little effect on bighorn sheep populations, because:

- Ø The activity does not occur in sheep habitat, or in occupied portions of sheep habitat;
- Ø The activity's disturbance is too small to produce an effect;
- Ø Project design features are applied to reduce the activity's effects to negligible levels;
- Ø The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to bighorn sheep populations include:

- Ø Cattle Grazing
- Ø Personal use firewood cutting
- Ø Personal use Christmas tree harvesting
- Ø Special Uses/Permits (including Outfitter and Guide Activity)

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Fire Suppression

Bighorn sheep prefer open, grassy habitats in the vicinity of steep escape terrain. Fire suppression has reduced the quality of sheep habitat in many areas of the Forest by allowing conifers to become established in grasslands. Conifers limit visibility and reduce forage production. Conifer encroachment on sheep ranges is thought to be a contributing factor in declining sheep numbers in the Painted Rocks herd {Project File document WILD-158.pdf}. Wildfires and prescribed burns on sheep ranges used by all three sheep herds on the Bitterroot National Forest may have improved habitat quality for sheep by reducing conifer encroachment.

Timber Harvest, Prescribed Burning, and Associated Activities

Appendix A lists a number of ongoing and reasonably foreseeable timber harvest and prescribed burning projects. The Bitterroot National Forest has harvested timber and ignited prescribed fires in some bighorn sheep winter ranges in recent years. Timber harvest and prescribed burning in sheep winter range counteract many of the effects of fire suppression by reducing conifer encroachment into grasslands, which in turn reduces predation risk to sheep by increasing sight distances. Canopy reduction and/or burning also stimulate forage production of native grasses and forbs. Spring burning could increase the risk of mortality to new-born lambs, but is generally restricted to avoid the period around typical lambing times in known lambing areas. Timber harvest and prescribed burning in sheep winter range generally improves the quality of sheep habitat and benefits sheep populations on the Bitterroot National Forest.

Invasive Plant Management

The low elevation, grassy slopes preferred by bighorn sheep for winter or year-long range are also susceptible to invasions of invasive plants that reduce the productivity of native grasses and forbs. Productivity of native grasses and forbs has been improved on some sheep ranges by herbicide applications intended to reduce invasive plant infestations. It is likely that improved forage productivity on sheep winter ranges has increased overall herd health and lamb survival to some extent, although these gains may have been overwhelmed by the negative impacts of pneumonia-like diseases in some herds.

Road and Trail Management

The existing Forest Transportation System was already in place before most current Bitterroot Valley bighorn sheep herds were established through reintroductions in the 1970s and 1990s. Some roads within bighorn sheep ranges have been closed since sheep were reintroduced, which may have reduced the potential for disturbance and poaching, and contributed to these herds becoming established. However, motorized use of trails through sheep summer ranges may have increased since these herds were reintroduced, which may have offset the benefits of road closures.

Most sheep herds have increased over time despite the effects of motorized vehicles using roads and trails within their ranges at current levels. Highway traffic on paved roads such as Highway 93 through year-round sheep range has increased since the 1970s. While such traffic occurring in a predictable time and place does not appear to disturb habituated sheep, it undoubtedly increases the risk of mortality to sheep through collisions with fast-moving vehicles. Road closures in ongoing or reasonably foreseeable timber harvest projects, such as Lower West Fork, would reduce the risk of motorized disturbance to bighorn sheep in some occupied sheep habitat.

Public Use

Motorized access to portions of the Bitterroot National Forest was restricted in a number of elk winter ranges by area closures established prior to implementation of the Forest Plan in 1987, and some of these closures also benefited bighorn sheep by reducing the risk of disturbance on sheep winter ranges.

Activities on Private and State Land

Forest management and domestic grazing activities on bighorn sheep habitat on state lands have been similar to those on Bitterroot National Forest System lands, and have generally improved the quality of bighorn sheep habitat by reducing conifer encroachment and motorized access.

Bighorn sheep are very susceptible to outbreaks of pneumonia-like diseases that often appear to result from direct contact with domestic sheep or goats. The Bitterroot National Forest has reduced the risk of such contact by eliminating grazing allotments for domestic sheep on the Forest. However, domestic sheep and goats on private lands continue to present a risk of infection since bighorn rams are well known for traveling long distances and interacting with domestic sheep and goats as well as with wild sheep in other herds (DeCesare and Pletcher 2006). Domestic herds have been shown or strongly suspected to be the source of the infectious diseases that have decimated bighorn sheep herds in many areas (including the East Fork Bitterroot herd in 2009).

Other activities on private land such as subdivision, fencing, road construction, and intensive grazing by cattle and horses reduce or eliminate the quality of bighorn sheep habitat.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to bighorn sheep by prohibiting motorized use on some routes in sheep summer and winter ranges. This would reduce the potential for human disturbance and mortality to bighorn sheep during the summer and winter. Cumulative effects to bighorn sheep from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to bighorn sheep because it would not change existing motorized access. All of the above listed present and reasonably foreseeable actions could have cumulative effects on big horn sheep, in combination with ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would increase cumulative effects to bighorn sheep slightly by allowing motorized use on some routes in sheep summer and winter range that are currently closed to motorized use. This would increase the potential for human disturbance and mortality to bighorn sheep during the summer and winter. Cumulative effects to bighorn sheep from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to bighorn sheep by prohibiting motorized use on some routes in sheep summer and winter ranges. This would reduce the potential for human disturbance and mortality to bighorn sheep during the summer and winter. Cumulative effects to bighorn sheep from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to bighorn sheep by prohibiting motorized use on some routes in sheep summer and winter ranges. This would reduce the potential for human disturbance and mortality to bighorn sheep during the summer and winter. Alternative 2 would not change the existing level of cumulative effects to bighorn sheep because it would not change existing motorized access. Alternative 3 would increase cumulative effects to bighorn sheep slightly by allowing motorized use on some routes in sheep summer and winter range that are currently closed to motorized use. This would increase the potential for human disturbance and mortality to bighorn sheep during the summer and winter.

Trends and Broader Context

Bighorn sheep were historically found throughout the mountains of western North America. Prior to the arrival of European man, their population is estimated to have been between 1.5 and 2 million (Legg 1999). By 1950, bighorn sheep were extirpated from large areas of their original range (Singer et al. 2000), and populations totaled fewer than 42,000 sheep in 1974 (Legg 1999). This decline was caused by contact with domestic sheep and subsequent transmission of diseases, competition with domestic livestock, subsistence hunting, and loss of habitat (Montana FWP 2010; Legg 1999). Bighorn sheep were also widely distributed across Montana in appropriate habitat, but similar declines reduced herds throughout the state. By 1930, bighorn sheep were reduced to small remnant bands and were considered by some to be an endangered or rare species (Montana FWP 2010).

Today, the Montana Natural Heritage Program and FWP rank the bighorn sheep as a G4 S4 species (Montana FWP 2015). This means that across its range and in Montana, the species is considered apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining. The present distribution and status of bighorn sheep in Montana is due to improved range conditions, reduced competition for forage from livestock and other wildlife, reductions in the number of sheep grazing permits on public land, reductions in the number of domestic sheep and goat herds, regulated hunting, and transplanting of bighorns to reintroduce or augment herds (Montana FWP 2010). By 2008, there were 45 different populations in the state, with an estimated total of 5,694 bighorn sheep (*Ibid*).

Effects Determination

See the Biological Evaluation/Assessment Summary (Section 3.5.8) for documentation of the effects determinations for bighorn sheep under these alternatives.

Alternative 1

Alternative 1 would reduce the potential for human disturbance and mortality to bighorn sheep during the summer by prohibiting motorized use on some routes in sheep summer range in the southern half of the Bitterroot National Forest. In addition, **Alternative 1** would prohibit motorized use of some routes on sheep winter ranges in the lower Sheephead Creek drainage, and in a much smaller area between Shirley Mountain and the East Fork Road. This would reduce the cumulative effects of past activities to a moderate extent. While such reductions in motorized access would be positive for sheep, motorized access in sheep habitat would still be permitted in much of the summer and winter range areas for the Skalkaho and East Fork herds, and for the Painted Rocks group of the Painted Rocks herd. As a result, the effects call for **Alternative 1** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 2 (No Action)

Implementation of **Alternative 2** would have No Impact to bighorn sheep populations or habitat because it would not change the existing condition for motorized access to sheep habitat. Cumulative impacts resulting from previous management actions would continue.

Alternative 3

Alternative 3 would increase the potential for human disturbance and mortality to bighorn sheep during the summer by allowing motorized use on some routes in sheep summer range in two areas that are currently closed to such use. In addition, **Alternative 3** would increase the potential for motorized use of some routes on sheep winter ranges in a large area in lower Watchtower Creek and a smaller area in several draws west of Elk Point. This would add to the cumulative effects of previous activities to a small extent. While such increases in motorized access would be negative for sheep, they are limited to a small percentage of sheep summer and winter ranges. As a result, the effects call for **Alternative 3** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Alternative 4

Alternative 4 would reduce the potential for human disturbance and mortality to bighorn sheep during the summer by prohibiting motorized use on all routes in sheep summer range in the southern half of the Forest. In addition, **Alternative 4** would prohibit motorized use of some routes on sheep winter ranges in the lower Sheephead Creek drainage, and in several smaller areas in the East and West Fork Bitterroot River drainages. This would substantially reduce cumulative effects of past activities to sheep. While such reductions in motorized access would be positive for sheep, motorized access in sheep habitat would still be permitted in much of the summer and winter range areas for the Skalkaho and East Fork herds, and for the Painted Rocks group of the Painted Rocks herd. As a result, the effects call for **Alternative 4** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

I. Elk (*Cervus elaphus*) (Management Indicator Species)

Effects Analysis Methods

One Forest Plan standard was evaluated for each alternative:

- Elk habitat effectiveness (Wildlife and Fish Standard 14) (an index of habitat effectiveness based on the miles of roads open to motorized use within each third-order drainage divided by the area of that drainage)

Five other evaluation criteria not tied directly to Forest Plan standards were also used to predict impacts to elk:

- Elk habitat effectiveness index (similar to EHE but includes miles of roads and trails open to motorized use within a third-order drainage)
- Elk security during the general hunting season (percentage of an elk herd unit classified as security area during the rifle season)
- Elk security index during the archery hunting season (percentage of an elk herd unit classified as security area during the archery season)
- Wildlife core security area during the summer outside of any hunting season (percentage of an area classified as security area during the summer)
- Percentage of elk winter range open to over-snow vehicles

The security area index percentage was calculated using the same methodology applied during the archery season. The Record of Decision for the Forest Plan requires retention of 25 percent of the big game winter range in thermal cover (USDA Forest Service 1987c). Thermal cover in winter range was not analyzed for this project because none of the proposed activities would change the existing amount of thermal cover. This standard will not be discussed further.

Synopsis of the Effects of Motorized Access to Elk

The acceleration of timber harvest on National Forests in the 1960s, 1970s, and 1980s required a dramatic expansion of the system of roads needed to access timber sales. Elk managers detected local declines in elk numbers that were attributed to a proliferation of roads and timber harvest during the period from 1950 to 1980. A study by Lyon et al. (1985) concluded that roads, and the people and traffic associated with them, have a more significant influence on elk security than most other factors combined. By the end of the 1980s, the association between roads, timber harvests, and local declines in elk numbers was obvious (Toweill and Thomas 2002). Timber harvest reduced the cover that had allowed elk to escape detection, and the network of roads associated with timber management allowed more hunters rapid access to elk habitat, dramatically increasing the vulnerability of elk to hunters. As elk vulnerability and hunter numbers both increased, mature bull elk were overharvested in many areas, resulting in reduced reproduction in some herds (*Ibid*).

Many factors affect elk vulnerability to hunter harvest, but the evidence is compelling that survival rates of elk are reduced in areas with higher road densities (Leptich and Zager 1991, Unsworth et al. 1993; Gratson and Whitman 2000; Hayes et al. 2002, McCorquodale et al. 2003). See Rowland et al. (2004) for a review. In a north Idaho study using radio-collared elk, Leptich and Zager (1991) found that access-related differences in mortality markedly influenced the sex and age structure of modeled elk populations. Mortality rates in their high road density treatment resulted in low bull-cow ratios, a young bull age distribution, and few mature bulls in the population, whereas their low road density treatment produced the highest bull-cow ratios and the oldest bull age distribution. Their results indicated that as road access increases, elk become increasingly vulnerable to hunting mortality. This in turn results in elk populations with undesirable sex and age structures, increasingly complex and restrictive hunting regulations to protect elk herds, and a loss of recreational opportunity for both the hunter and the non-consumptive user of the elk resource.

In a local example of these effects, the elk herd in the highly roaded northern part of the Sapphire Mountains only had 3 bulls per 100 cows in 1989 (Hillis et al. 1991), all of which were spikes. This extremely low bull/cow ratio and young bull age distribution suggested that bull mortality due to hunting was very high (*Ibid*), and prompted the Lolo National Forest, in cooperation with the FWP, to close most of the extensive system of logging roads on the east side of the Sapphire Divide between Sawmill Saddle and Cinnabar Creek. As a result of these road closures and the implementation of branch-antlered bull regulations, bull-cow ratios in this area improved to the mid- 20s by 2004.

Agency responses to elk population declines ranged from shortening seasons and reducing hunter numbers through permits, to the development of access management programs. The combination of these management approaches reduced elk vulnerability to hunting mortality, and is largely responsible for the elk population increases that have occurred across the west despite growing numbers of elk hunters, and the resulting high quality elk hunting enjoyed by resident and out of state hunters alike (Toweill and Thomas 2002).

Beginning in the 1980s, recreation on public lands has taken on an entirely new context with the increasing popularity of OHVs that allow relatively easy access to formerly remote unroaded terrain, or areas accessed by closed roads. Among other effects to wildlife populations and habitat, use of OHVs during hunting seasons has increased elk vulnerability to hunters in much the same manner as the proliferation of roads did in the 1960s, 1970s, and 1980s (Toweill and Thomas 2002).

In an eloquent controlled experiment using wild elk fitted with GPS collars, Wisdom et al. (2004) compared indicators of elk disturbance levels (movement rates and probability of flight response) resulting from off-road use by hikers, horseback riders, mountain bikers, and ATVs. Movement rates of elk were substantially higher during periods of all four off-road activities compared to periods of no human activity. Peak movement rates of elk (indicating level of disturbance) were highest during ATV activity, somewhat lower for mountain bike riding, and still lower for both horseback riding and hiking. The probability of flight response (elk running from a disturbance source) was higher during ATV and mountain bike activity, in contrast to lower probabilities observed during hiking and horseback riding. The probability of flight response declined with distance from the disturbance, but at different rates. Probability of flight response declined most rapidly during hiking, with little effect when hikers were beyond 500 meters from an elk. In contrast, higher probabilities of elk flight continued beyond 750 meters from horseback riders and 1,640 meters from mountain bike and ATV riders. Similarly, Vieira (2000) found that elk moved twice as far from ATV disturbance as they did from pedestrian disturbance. ATVs (and presumably motorcycles) create a larger disturbance zone than any of the nonmotorized activities both because elk can hear them from further away, and because ATVs can cover a much greater distance per unit of time. This leads to the conclusion that motorized recreationists have the potential to disturb many more animals in a day than non-motorized recreationists.

Naylor et al. (2009) reanalyzed the data collected during the Wisdom et al. (2004) study, and used it to compare the effects of the same four off-road recreational uses to elk travel response, resting time, and foraging time. They found that exposure to ATV use resulted in the greatest increase in elk travel response and resting time, and largest decrease in foraging time of any of the four treatments. Elk moved further from trails and spent more time hiding in response to ATV use than to any of the nonmotorized uses. Exposure to mountain biking resulted in an intermediate increase in elk travel response, but elk foraging time increased. Overall, horseback riding caused the lowest travel response in elk, and was not different from controls for half the replicates, indicating that elk were not affected as much by this recreational activity. Effects on feeding and resting times were mixed; hiking resulted in effects to elk that were between those caused by mountain biking and horseback riding.

Ciuti et al. (2012) found that in human-dominated landscapes in Alberta, the effects of humans in shaping elk behavior exceeded the effects of habitat and natural predators. They showed that both the number of people using an area and the type of activities those people were engaged in affected elk behavioral responses. They found that motorized vehicles had a stronger impact on elk behavior than nonmotorized activities, including hikers, mountain bikers, and equestrians. Bikers and equestrians had no effect on elk behavior, likely because they were more predictable and rarely left roads and trails. Hikers evoked an increase in time that elk spent travelling, while ATV use resulted in a significant increase of scan frequency and the amount of time spent scanning. In addition, they found that in human-dominated landscapes where hunting is allowed, elk behavioral responses to road traffic can be extreme, potentially leading to high vigilance levels, increased flight distance, increased movement rates, and eventually, displacement from areas surrounding roads and thus habitat loss. In areas open to hunting, where elk perceive humans to be potential predators, extremely low traffic volumes were sufficient to trigger behavioral responses by elk, including an increase in vigilance and scanning, and an increase in time spent travelling. Increases in these behaviors results in decreased time spent foraging, which can in turn lead to reduced reproductive success and potentially impact populations.

Use of ATVs, trail motorcycles, and other off-highway vehicles has facilitated increasing levels of human disturbance of elk on summer ranges before and during the archery season. Elk in many areas across the western United States (including the Sapphires) appear to be changing their movement and distribution patterns in an attempt to reduce their risk of mortality due to human predation (hunting) (Burcham et al. 1999, Vieira 2000, Conner et al. 2001, Viera et al. 2003, Wertz et al. 2004; Haggerty and Travis 2006; Grigg 2007; Proffitt et al. 2010). Elk seem to be able to quickly assess gradients of (predation) risk across the landscape and respond accordingly. Elk respond similarly to predation risk from wolves and from humans, but their responses to human predation risk are stronger than responses to wolf predation risk (Proffitt et al. 2009). Elk avoid hunting pressure by finding habitats that minimize encounters with hunters. This “security cover” is most often thought of as dense forest cover with low open-road densities, but elk are increasingly using private lands that allow no or limited hunting as an alternative form of security area (Burcham et al. 1999, Proffitt et al. 2013, Dickson 2014).

In a recent graduate study of several elk herds in and around the Madison Valley south of Ennis, Montana Grigg (2007) found that elk subjected to high levels of human disturbance during the archery season tended to abandon their summer ranges and migrate to winter ranges on large, private ranches where they found refuge from hunting pressure. Early migration in hunted herds began with the onset of the archery season, rather than the arrival of deep snow. Most elk in affected herds had relocated to winter ranges on private refuges by the end of the archery season, thus becoming largely unavailable to hunters on public land during the rifle season. Roads and trails receiving less human use and relatively lower-impact types of use (e.g. hiking vs. motorized use and non-hunting vs. hunting pressure) appeared to have less impact on elk movements and distribution. This was evident because elk in study areas closed to hunting did not migrate to winter ranges until deep snow on summer ranges forced them to move.

An earlier study by Vieira et al. (2003) in Colorado concluded that once this pattern of early movement to private winter ranges is established, it is very difficult to reverse the pattern and re-establish “normal” distribution and movement patterns using techniques such as reducing hunter numbers on public lands. A study by Burcham et al. (1999) in the Blackfoot River drainage in western Montana suggested that once elk begin to use private land refuges, elk numbers on those refuges will increase over time. They also suggested that the amount of time elk use private land refuge sites will increase to include other seasons besides the hunting season, and that elk use of these refuges may eventually expand to year-round use.

Haggerty and Travis (2006) documented this type of shift in elk distribution from a traditional migratory pattern to year-round use of winter range on private land refuges in the Upper Yellowstone River Valley of southwest Montana in the 1980s and 1990s. Many large cattle ranches in the area were purchased by wealthy non-resident owners who viewed elk as a desirable amenity rather than a nuisance that impacted cattle operations. Most of these new owners closed their ranches to hunting, and elk responded by staying in these areas where they found plentiful forage and avoided hunting pressure. Elk herds that had historically migrated between high-elevation summer ranges and low-elevation winter ranges essentially became year-round residents on many larger ranches.

A study in eastern Oregon (Wertz et al. 2004) documented a similar change to year-round use of elk winter ranges over a period of 20 years. The traditional use pattern for elk in the Blue Mountains was to migrate to high elevation summer range in early summer and return to low elevation winter range in late fall. Migration patterns for elk in this area changed dramatically between 1970 and 1990. Sixty seven percent of collared cow elk never migrated from low elevation winter ranges on private land to high elevation summer range on public land from 1988 - 1990. The major influence causing the shift to year-round use of private lands was thought to be the security offered on private lands, where access was tightly controlled, coupled with the high level of vehicle use on the National Forest System lands (*Ibid*). Wolves did not occur in Oregon during this period, so they could not have been the cause of this change in elk distribution. Interestingly, Wertz et al. (2004) found that reducing open road densities to about 1 mile per square mile and prohibiting off-road vehicle use on National Forest System lands resulted in partially restoring traditional elk migration patterns over a five year period, even without increasing disturbance to elk on private land refuges (*Ibid*).

Montana Fish, Wildlife & Parks has documented several local examples of similar changes in elk behavior and movement patterns. The old Skalkaho Game Preserve (Skalkaho Basin/Falls Creek area) on the Bitterroot National Forest used to be prime elk summer range, and over 100 elk were seen there on a summer flight as recently as 2002. Elk use of this area has been steadily declining until very few are observed there now—only 17 during a FWP flight in 2006 and 23 in 2007 {Project File document WILD-020.pdf}. Off-highway vehicle use in the area has been increasing during the period when elk numbers declined, and it is likely that those two trends are not unrelated. In mid-July 2007, approximately 82 percent of the elk observed during a flight over Hunting District (HD) 261 (which includes the Skalkaho Basin area) were in the low sagebrush/grasslands south of the Burnt Fork rather than on high elevation summer ranges {Project File document WILD-021.pdf}. In other examples, FWP aerial surveys found 806 elk on winter range on a single large private ranch that does not allow public hunting in October 2007, during the week before the rifle season {Project File document WILD-022.pdf}. Similar surveys in 2008, 2009, 2010, and 2011 found 1,017 elk, 1,038 elk, 760 elk, and 805 elk, respectively, on the same ranch the week before the rifle season or the first week of the season {Project File documents WILD-023, 101 to 103, 105.pdf}. Many elk apparently delayed their movement onto this ranch in 2010 for unknown reasons, but FWP counted 1,536 elk there during the second week of the rifle season, more than twice the number counted two weeks previously{Project File document WILD-104.pdf}.

Based on these numbers, an average of 45 percent (range 37.6 percent - 52.2 percent) of the elk found on the spring elk trend-count flights for the northern part of HD 270, and an average of 14 percent (range 11.2 percent to 17.1 percent) of the elk found on the spring elk trend counts for the entire Bitterroot drainage were on this single ranch prior to or early in the rifle hunting seasons in 2007 to 2011 {Project File document WILD-106.pdf}, and were thus largely unavailable to hunters. Elk from the Sapphire Mountains (and to a lesser extent the Bitterroot Mountains) also move onto other private ranches with few or no public hunting opportunities prior to the hunting season. In 2008, at least 33 percent of the total number of elk counted during the Bitterroot spring trend count were on private land winter ranges by the opening day of rifle season {Project File document WILD-024.pdf}, and were thus largely unavailable to hunters. This early movement to private land refuges at least partially accounts for the perceived lack of elk on public lands during the rifle season that many hunters attribute largely to the impacts of wolf predation.

Montana FWP has documented this shift in elk distribution from public to private lands by elk seeking to avoid hunting pressure in many parts of Montana (Dickson 2014). The decreased availability of elk on public lands has limited the effectiveness of FWP's main tool for regulating elk populations (public land hunting), which has reduced the agency's ability to manage elk herds at desirable levels (*Ibid*). Ironically, increasing road and trail access routes to elk summer ranges may actually decrease public access to these animals during hunting seasons as elk respond to early hunting pressure by shifting to winter ranges on privately-owned refuge areas prior to the rifle season (Grigg 2007).

This change in seasonal elk distribution may be detrimental to elk populations for several reasons. Elk that move onto winter ranges in the early fall may consume a large percentage of the available forage before the onset of winter, and may thus not have access to adequate forage to sustain them until the spring. This can result in declining elk numbers through starvation, or by reducing the health of calves born to undernourished cows. In addition, the risk of disease increases when large numbers of animals are concentrated in small areas for long periods of time (Proffitt et al. 2010). Large numbers of elk residing on private lands for much of the year frequently results in damage complaints from landowners, which can trigger FWP control actions to reduce elk numbers.

Affected Environment

Population

The Forest Plan objective is to provide sufficient habitat to maintain the current (as of 1987) level of big-game hunting opportunities (USDA Forest Service 1987a, II-5, II-7).

Elk trend counts for Bitterroot hunting districts come from FWP monitoring flights conducted each spring {Project File document WILD-052.pdf}, and are summarized in Table 3.5-26, below. Trend count figures from 1987 are also shown for comparison with the Forest Plan objective. Montana Fish, Wildlife & Parks population objectives come from the 2004 Montana Elk Plan (Montana FWP 2004, amended).

Table 3.5- 26: Elk Trend Counts by Hunting District

Hunting District #	1987	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	FWP Population Objective
204 & 261:													
North of Ambrose	201	682	688	508	438	429	390	466	481	467	363	540	400
Ambrose to Willow	231	584	470	507	569	437	413	362	491	473	539	573	520
South of Willow	667	653	658	529	527	462	444	527	534	440	528	668	400
240	480	1016	940	774	682	460	645	694	719	714	572	578	750
250	994	1614	1914	1462	1373	863	744	764	785	812	985	744	2000
270	964	2226	3499	4135	3608	3299	3527	3480	3595	3332	4386	3822	3000
Bitterroot Drainage	3537	6775	8169	7915	7197	5950	6163	6293	6605	6238	7373	7373	7070

Table 3.5-26 shows that the number of elk in the Bitterroot drainage far exceeds the Forest Plan objective of maintaining the 1987 level of big-game hunting opportunities. The 2014 elk trend count indicates that the number of elk counted in the drainage was approximately 208 percent of the number counted in 1987.

The number of elk counted on winter ranges on or adjacent to the Forest generally increased from a total of 2,419 in 1965 to a high of 8,169 in 2005. The total number of elk counted declined substantially from 2005 until 2008, when 5,950 were counted, but has increased slowly since then {Project File document WILD-052.pdf}. The current population objective for elk in the Bitterroot drainage is 7,070 (Montana FWP 2004, amended), so the number of elk counted in spring of 2014 was about 4 percent above the objective. Predation by wolves is often blamed for the recent decline in elk numbers, and wolves certainly kill some elk. However, FWP increased the number of antlerless elk permits in the mid-2000s because elk populations exceeded objectives and were causing damage on private ranches and farms, and antlerless harvests around that time were high. In 2009, a FWP publication indicated that the decline in elk numbers in the Bitterroot was likely primarily due to increased antlerless harvests achieving a planned management reduction, and that there was no evidence that wolves or combined predator numbers had much to do with the decline of elk counted through 2008 (Hamlin and Cunningham 2009). In addition, the FWP biologist in 2007 felt that much of the decline that year was due to nutritional stress caused by poor forage conditions in 2006 that may have caused poor calf survival {Project File document WILD-026.pdf}.

Preliminary results from the ongoing Bitterroot Valley Elk Ecology Study in the East and West Forks do not support the hypothesis that wolves are a major mortality factor for elk in the Bitterroot drainage {Project File document WILD-108.pdf}. Mountain lion predation was identified as the largest mortality factor for elk calves in both the East Fork and West Fork herds, while nutritional limitations in the West Fork may be preventing cow elk from accruing enough fat reserves to maintain a pregnancy or produce healthy calves (Backus 2014).

Cow/calf and cow/bull ratios are indicators of herd health. Cow/calf and cow/bull ratios for Bitterroot hunting districts come from FWP elk trend count flights {Project File document WILD-109.pdf}, and are summarized in Tables 3.5-27 and 3.5-28, respectively, below:

Table 3.5- 27: Number of Elk Calves per 100 Elk Cows for Bitterroot Hunting Districts

Hunting District #	1987	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
240	43	39	32	39	24	25	12	25	32	29	32	37
204	50	37	57	33	24	33	11	14	18	24	25	30
261	51	30	35	29	20	24	21	18	22	25	24	39
250	49	35	32	24	15	25	9	11	18	15	33	29
270	41	47	36	40	29	30	15	15	19	24	23	34
Bitterroot Drainage	48	39	37	34	23	28	14	16	20	23	25	33

Table 3.5- 28: Number of Elk Bulls per 100 Elk Cows for Bitterroot Hunting Districts

Hunting District #	1987	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
240	7	20	18	61	19	21	9	9	10	7	8	11
204	13	26	18	37	21	24	14	13	18	18	21	19
261	21	39	19	52	28	NA	28	16	20	26	14	28
250	13	35	18	21	11	22	7	4	9	11	12	20
270	20	47	17	17	21	47	10	9	8	12	9	17
Bitterroot Drainage	17	19	18	28	19	39	11	10	11	13	11	18

Cow/calf and cow/bull ratios plummeted in all HDs on the Forest in 2009. Cow/calf ratios have improved somewhat each year since then, and have returned to the average range for the period since 1988. Cow/bull ratios declined further in 2010, and have generally remained well below recent averages, although the 2014 number is promising. Montana Fish, Wildlife & Parks and local hunting groups have been quite concerned about the future of the Bitterroot elk herd given these low calf and bull numbers. There is considerable debate over the cause of low calf and bull numbers. Predators are a prime suspect, although at least one study found that human disturbance during the calving season may cause decreased reproductive success for elk (Phillips and Alldredge 2000). University of Montana and FWP research biologists have completed the third and final year of data collection for an elk-predator-nutrition study in the southern Bitterroot to look at potential causes, and have identified mountain lion predation and nutritional limitations as primary factors (Backus 2014). In the meantime, FWP has drastically reduced the number of elk permits available on Bitterroot HDs in an effort to increase elk numbers by limiting hunter-caused mortality.

Elk Habitat Effectiveness

It has been repeatedly documented, in Montana and throughout North American elk range, that vehicle traffic on forest roads evokes an avoidance response by elk. Even though the habitat near forest roads is fully available to elk, they cannot effectively utilize it (Lyon et al. 1985). Declines in elk use have been detected as far as 2 miles from open roads, but significant reductions in habitat effectiveness are usually confined to an area within a half mile. Losses in habitat effectiveness for elk can be mitigated by applying road design and location standards during construction, and reduced through road closures (*Ibid*).

The Forest Plan standard for elk habitat effectiveness (EHE) is to manage roads through the Travel Management Planning Project process to attain or maintain 50 percent or higher EHE in currently roaded drainages (those where more than 25 percent of the potential road system was in place in 1987), and 60 percent or higher EHE in drainages where less than 25 percent of the roads had been built (USDA Forest Service 1987a, page II-21). Elk Habitat effectiveness values of 50 percent and 60 percent equate to open road densities of 2 miles and 1 mile of open road per square mile of land, respectively (Lyon 1983).This standard supports the Forest Plan objectives of maintaining habitat to support viable populations of wildlife species, and cooperating with the state of Montana to maintain the current level of big game hunting opportunities (USDA Forest Service 1987a, page II-5). The EHE model described by Lyon (1983) does not explicitly factor in noise to help determine the effects of motorized vehicles on the ability of elk to utilize habitat near roads. However, noise from vehicles likely affects the distance from roads at which elk are disturbed, and would thus be one of the implicit factors that influenced the amount of elk use at various distances from open roads documented by Lyon (1983). Creel et al. (2002) showed that snowmobile use in Yellowstone National Park increased stress levels in animals as measured by glucocorticoid levels in elk and wolf feces, but does not explicitly measure or mention noise as a factor in such disturbance.

The EHE model described by Lyon (1983) was the best information available at the time the Forest Plan was implemented. Elk habitat effectiveness was determined using the Forest's Transportation System database to determine open road density within each third-order drainage, and then converting that to EHE using the model described in Lyon (1983). The Forest has typically modified the original Lyon (1983) methodology by calculating EHE based solely on open road density and excluding cover calculations. In the current analysis, EHE was calculated by defining an open road as any road open to full-sized vehicles during all or part of the year (MVUM codes 1-4). Roads that are closed to full-sized vehicle use all year are counted as closed roads, though some unquantified level of authorized or unauthorized OHV use occurs on some of those roads. Roads that are closed seasonally are considered open roads for the purposes of this EHE analysis because small herds of elk are present within the roaded part of many drainages within the Forest year-round, and never migrate to higher elevation summer ranges. Vehicle traffic on those roads thus reduces the effectiveness of elk habitat during some months of the year. Road prisms that are closed to full-sized vehicles but open seasonally or year-round to ATVs and/or motorcycles are considered to be closed roads for this EHE analysis because technically they are now operating as trails. The EHE model (Lyon 1983) did not account for motorized use on trails, so they are not included in these calculations to determine compliance with the EHE standard; motorized trails are included in the EHE Index calculations in the next section.

Open road densities were calculated using these assumptions for third-order drainages across the Forest utilizing GIS and updated road status data contained in the INFRA database. The results of open road density calculations within individual third-order drainages for the existing condition are contained in the {Project File folder 'wildlife,' Project File document WILD-055.pdf}, but are not displayed here since there are several hundred third-order drainages. Rather, the results were summarized by the number of drainages meeting and not meeting the EHE standard (as determined by open road densities) across the entire Forest {Project File document WILD-053.pdf}, and are displayed below in Table 3.5-29. These results were then mapped to show the spatial relationship of drainages that meet or do not meet the EHE standard {Project File document WILD-110.pdf}. This analysis excluded third-order drainages within Designated Wilderness, as EHE in those areas is assumed to be 100%, and will not change.

Table 3.5- 29: Number of Third-Order Drainages Meeting and Not Meeting the EHE Standard for the Existing Condition (Alternative 2)

# Third -Order Drainages in Compliance with EHE Standard	# Third-Order Drainages Out of Compliance with EHE Standard
275	111

Most of the third-order drainages that do not meet the EHE standard are either in HD 250 or HD 270 {Project File document WILD-110.pdf}. The elk population in HD 250 has declined dramatically since 2005, and has typically failed to meet the FWP objective for elk populations (Table 3.5-26). The elk population in HD 270 has remained stable or increased slightly since 2005, and has exceeded the FWP objective every year since then (*Ibid*). This difference in elk population trends shows that there is not necessarily a linear relationship between EHE and elk populations, and illustrates that EHE is only one of many factors that may influence elk populations in an area.

In addition, the results of open road density calculations, and the EHE percentages that result from those densities (Lyon 1983) were summarized by Hunting District {Project File document WILD-054.pdf}, and are displayed in Table 3.5-30 below for the existing condition.

Table 3.5- 30: Elk Habitat Effectiveness by Hunting District (using only Roads) for the Existing Condition

HD Number	Alt. 2[1]	Alt. 2
Hunting District Number and (Area)	Open Road Density	EHE %
204 (28.5 Sq. Miles)	2.4	46%
240 (481.1 Sq. Miles)	0.3	85%

HD Number	Alt. 2[1]	Alt. 2
Hunting District Number and (Area)	Open Road Density	EHE %
250 (664.9 Sq. Miles)	0.8	66%
261 (118.5 Sq. Miles)	0.9	63%
270 (466.0 Sq. Miles)	1.2	58%
Entire BNF (MT portion) (1,759.2 Sq. Miles)	0.8	66%

[1] Open Road Density = total length of roads open to motorized vehicles within a third-order drainage divided by the area of that drainage in square miles.

Elk Habitat Effectiveness Index

The Forest also calculated an EHE "Index" based on the EHE model described in Lyon (1983), but modified by including both roads and trails open to motorized use in calculating open route density. This analysis assumes that motorized traffic on trails affects elk similarly to motorized traffic on roads. Open **routes** are defined as any road **or trail** open to any type of motorized vehicles during all or part of the year (MVUM codes 1-4 and 7-10). This analysis will use a hypothetical "EHE Index Guideline" as a measure with which to compare open route densities within third-order drainages. This guideline uses open route densities of 2 miles/square mile in "roaded" drainages, and 1 mile per square mile in "unroaded" drainages as criteria of comparison. Since the original EHE model did not include motorized trails, this EHE Index is not intended for use when determining compliance with the Forest Plan EHE standard. Rather, it offers an additional way to compare the effects of the alternatives. The EHE Index allows a more comprehensive analysis of the effects of motorized use on the Forest to elk than EHE alone, although use of the EHE Index is not required by the Forest Plan.

Roads or trails that are closed seasonally are considered open routes for the purposes of this EHE Index analysis because small herds of elk are present within the roaded part of many drainages within the Forest year-round, and never migrate to higher elevation summer ranges. Vehicle traffic on those routes thus reduces the effectiveness of elk habitat during the months of the year when elk are presumably present. Road prisms that are closed to full-sized vehicles but open seasonally or year-round to ATVs and/or motorcycles are considered to be open routes for this EHE Index analysis because motorized use of trails is assumed to affect elk in ways similar to motorized use on roads (see discussion in Section 3.5.5 A of this document).

Open route densities were calculated using these assumptions for third-order drainages across the Forest using GIS and updated road and trail status data contained in the INFRA database. The results of open route density calculations for the existing condition are contained in the {Project File document WILD-114.pdf}, but are not displayed here since there are several hundred individual third-order drainages. Rather, the results were summarized by the number of drainages that would meet and not meet the hypothetical "EHE Index Guideline" across the entire Forest {Project File document WILD-053.pdf}. The results are displayed below, in Table 3.5-31. These results were then mapped to show the spatial relationship of drainages that meet or do not meet the EHE Index Guideline when including both open roads and trails in the calculations {Project File document WILD-118.pdf}. This analysis excluded third- order drainages within Designated Wilderness, as the EHE Index in those areas is assumed to be 100 percent, and will not change.

Table 3.5- 31: Number of Third-Order Drainages Meeting and Not Meeting the Hypothetical EHE Index "Guideline" for the Existing Condition (Alternative 2)

# Third-Order Drainages that Meet EHE Index "Guideline"	# Third-Order Drainages that Do Not Meet EHE Index "Guideline"
174	212

In addition, the results of open route density calculations (and the EHE Index percentages that result from those densities) were summarized by Hunting District {Project File document WILD-059.pdf}, and are displayed in Table 3.5-32, below, for the existing condition.

Table 3.5- 32: Elk Habitat Effectiveness Index by Hunting District (using Roads and Motorized Trails) for the Existing Condition

HD Number	Alt. 2	Alt. 2
Hunting District Number and (Area)	**Open Route Density**	**EHE Index%**
204 (28.5 Sq. Miles)	3.2	39%
240 (481.1 Sq. Miles)	0.4	78%
250 (664.9 Sq. Miles)	1.6	54%
261 (118.5 Sq. Miles)	1.4	56%
270 (466.0 Sq. Miles)	2.0	50%
Entire BNF (MT portion)(MT portion) (1759.2 Sq. Miles)	1.4	56%

Elk Security Area (Rifle Season)

Subsequent to the Forest Plan, a model developed by Hillis et al. (1991) has been used in recent Bitterroot National Forest project planning to ensure retention of adequate elk security area during the general hunting season when elk are most vulnerable. This model is intended to be applied on an elk herd unit scale. However, elk herd unit boundaries have not been defined for the Bitterroot drainage. Many elk herd units include private land in the Bitterroot Valley, as well as portions of other National Forests outside the area covered by this planning effort, and the Forest's road and vegetation data is limited in those areas. Therefore, this analysis uses the portions of FWP Hunting Districts within the Bitterroot National Forest as surrogate elk herd units, with the caveat that these Hunting Districts may include all or part of several actual elk herd units, or that some actual elk herd units may be split by Hunting District boundaries. Elk in many areas, including the Bitterroot drainage, have started to use large areas of private land where hunting access is limited or not permitted as security areas, even though little or no vegetative hiding cover exists. These non-traditional security areas are not included in the Elk Security Area calculations.

Elk security areas have been mapped within the Bitterroot National Forest portion of Hunting Districts using the criteria from Hillis et al. (1991). Security areas are defined in Hillis et al. (1991) as non-linear polygons of cover that are greater than 250 acres and more than ½ mile from a road open to motorized use during the rifle hunting season. Elk security area was calculated by using GIS to overlay the transportation system database layer with the R1VMap canopy cover classifications, and then determining the percentage of each elk herd unit classified as cover that is further than ½ mile from any road or trail open to motorized vehicles during the rifle season. Maps for the existing condition are in the {Project File documents WILD-123 and 124.pdf}. This methodology was modified somewhat to fit the analysis tools available to the Forest, as described below.

Hillis et al. (1991) did not include motorized trails as a component of their model, possibly because motorized use of trails during hunting season was not very prevalent on the Lolo National Forest at that time. However, they recommended that closed roads within security areas and buffers be kept to a minimum because use of closed roads by hunters on foot, horseback, or mountain bikes increases elk vulnerability, and thus makes the security area less effective. Given the relative ease of access provided by motorized trails, and the amount of use that motorized trails now receive on the Bitterroot National Forest, the Project Biologist decided to include open motorized trails in the same category as open roads when determining the location and size of elk security areas.

"Cover" is not defined in Hillis et al. (1991), but the project's wildlife biologist assumed that it was analogous to hiding cover. Since the scale of this analysis is so large, the Forest used the VMap vegetation classification system to estimate where cover might occur on the landscape. VMap does not estimate a horizontal cover component, but rather estimates canopy cover. VMap classifies canopy cover into categories of less than 25 percent, 25 to 60 percent, and greater than 60 percent. The assumption was made that polygons where canopy cover was estimated to be less than 25 percent did not provide hiding cover, and that polygons where canopy cover was estimated to be greater than 60 percent did provide hiding cover. Polygons with canopy cover between 25 and 60 percent may or may not provide hiding cover, so it was assumed that half of the acres in that category would provide hiding cover, and half would not. Additionally, adjacent “cover” polygons were grouped to determine whether cover blocks met the 250 acre minimum.

Estimates of security area percentages by Hunting District (HD) for the existing condition, based on the above assumptions, were derived using GIS. Estimates of security area percentage were run separately using the VMap “high”canopy cover category to indicate hiding cover {Project File document WILD-123.pdf}, and again using the VMap “high” and “moderate” canopy cover categories to indicate hiding cover {Project File document WILD-124.pdf}. The difference between these estimates indicated the acres identified as “moderate” canopy cover. Since half of the “moderate” canopy cover acres were assumed to provide hiding cover, half of the acres identified as “moderate” canopy cover were added to the acres identified as “high” canopy cover to develop an estimate of adjusted security acres within each HD, which was divided by the total number of acres in that HD to estimate the adjusted security area percentage {Project File document WILD-122.pdf}. This analysis likely overestimated the amount of security area on the Bitterroot National Forest, since the latest VMap product is based on 2002 satellite imagery. Wildfires and timber harvest that reduced hiding cover since that time are not reflected in these security area estimates.

Table 3.5-33 below displays the resulting security area percentages by Hunting District and across the Montana portion of the Forest using the above assumptions for the existing condition:

Table 3.5- 33: Elk Security Area Percentage during the Montana Rifle Season, Existing Condition

Hunting District #	Total Acres (on BNF)	Security Area Acres	Security Area %
204	18,266	951	5.2
240	307,936	53,580	17.4
250	425,567	76,687	18.0
261	75,866	12,321	16.2
270	298,245	41,866	14.0
Entire BNF (MT Portion)	1,125,879	185,403	16.5

Adequate elk security exists when at least 30 percent of an elk herd unit qualifies as security area (Hillis et al. 1991). Elk security areas occur in wilderness, large areas devoid of roads or motorized trails, and in some other areas within the Forest where seasonal or year-round road use restrictions limit vehicular access to large portions of the area during hunting season.

This security area analysis shows that none of the Hunting Districts used as surrogate elk herd units comes close to meeting the 30% minimum level recommended by Hillis et al. (1991). This is partly due to high open road and trail densities in some areas, and partly due to a lack of cover in some areas. The lack of cover may be due to previous timber harvest or recent wildfires in some areas. In other areas, especially portions of HDs 240 and 250 in the Bitterroot Mountains, lack of cover is largely due to extensive areas of exposed bedrock and thin soils created by glacial scouring. Many of these areas are in the Selway-Bitterroot Wilderness, and are probably not capable of growing the vegetation needed to provide hiding cover for elk.

Elk Security Area Index During the Archery Season

In addition, the elk security area percentage during the archery season was analyzed separately. This analysis was a modified version of the Hillis, et al. (1991) technique, and it is presented as an “index” that allows comparison between alternatives. This analysis was performed using the same Hunting District boundaries as surrogates for elk herd units as described above. However, roads and trails were classified as open or closed to motorized use based on their status during the archery season, which typically begins around the beginning of September. Otherwise, the analysis used the techniques described above in the Elk Security Area (rifle season) section. The project’s wildlife biologist is unaware of any publication that recommends a minimum security area percentage during the archery season.

The elk security area index offers a way to compare the potential effects of motorized access to elk habitat during the archery season between alternatives. As discussed in the Synopsis of the Effects of Motorized Access to Elk at the beginning of the Elk section of this chapter, elk have started to respond to hunting pressure during the archery season by moving to more secure areas, which increasingly are found on private lands that restrict or do not allow public hunting. Motorized access allows archery hunters to reach many remote summer ranges that used to be relatively secure areas for elk. This is a concern because increased access during archery season appears to cause elk to begin moving to private land refuges prior to the rifle season.

Estimates of Elk Security Area Index percentages by Hunting District based on the above assumptions were derived using GIS. Maps for the existing condition are in the Project File {Project File documents WILD-132 and 133.pdf}. Geographic information system tables showing acres of security area based on these maps are summarized {Project File document WILD-131.pdf}. Table 3.5-34, below, displays the Elk Security Area Index by Hunting District and across the Montana portion of the Forest for the existing condition,

Table 3.5- 34: Elk Security Area Index during the Montana Archery Season, Existing Condition

Hunting District #	Total Acres (on BNF)	Security Area Acres	Security Area %
204	18,266	399	2.2
240	307,936	52,550	17.1
250	425,567	52,048	12.2
261	75,866	10,453	13.8
270	298,245	30.701	10.3
Entire BNF (MT Portion)	1,125,879	146,151	13.0

This Security Area Index analysis shows that security area percentage during the archery season is lower in all the Hunting Districts than it is during the rifle season. This makes sense since more roads and trails are open to motorized use during the archery season than during the rifle season, which results in fewer areas more than ½ mile from an open road.

Wildlife Core Security Areas

As discussed in the Analysis Methodology (Section 3.5.5), Rowland et al. (2000) suggest that it may be more biologically meaningful to evaluate road effects to wildlife based on distances from roads and spatial pattern of roads than on traditional road density models. To analyze the general effects of motorized routes on elk outside the hunting season, a ½ mile buffer was applied to either side of each route open to motorized use during the summer. This buffer width was selected because several studies indicate that elk select for areas greater than ½ mile away from open roads (e.g. Lyon 1983, USDA Forest Service 1982a). Other studies have shown that elk may be influenced by ATV travel on off-road transects more than 1500 meters away from the transect (e.g. Wisdom et al. 2004), so a ½ mile buffer width is conservative.

The area within this buffer along motorized routes is considered to be the “virtual footprint” of the route, within which motorized use may have some impact to wildlife. The percent of a defined area outside of this virtual footprint is then classified as “core security area.” There is no cover component required for an area to qualify as core security area in this analysis. A minimum size for core security areas was not incorporated into the analysis. The core security area is the area in which wildlife is generally undisturbed by travel routes and the activities that occur on them. This approach was used to analyze the potential impacts of motorized use to elk during the summer, outside of any hunting season. This approach could also be used to analyze effects for other wildlife species, but the effects of motorized routes to other species are generally not as well documented as are effects to elk.

Estimates of wildlife core security area percentages by hunting district based on the above assumptions were derived using GIS {Project File document WILD-070.pdf}. Maps for the existing condition are in {Project File document WILD-144.pdf}. Table 3.5-35 displays Wildlife Core Security Area acres and percentages by hunting district and for the Montana portion of the Forest for the existing condition (**Alternative 2**).

Table 3.5- 35: Wildlife Core Security Area Percentage during the Summer, Existing Condition

Hunting District #	Total Acres (on BNF)	Core Security Area Acres	Core Security Area %
204	18,266	1,194	6.5
240	307,936	250,080	81.2
250	425,567	160,252	37.7
261	75,866	19,580	25.8
270	298,245	82,152	27.5
Entire BNF (MT Portion)	1,125,879	513,258	45.6

The amount of Core Security Area is much higher than the Elk Security Area and Elk Security Area Index amounts due to the lack of a cover component in the calculations.

Percentage of Elk Winter Range Open to Over-snow Vehicle Use

Elk winter range was identified by wildlife biologists from FWP and the Bitterroot National Forest in the early 1970s, and winter range maps have been updated several times since then {Project File document WILD-039.pdf}. Elk winter range in the Bitterroot Valley is generally defined as lands below 6,200 feet in elevation and above areas of residential development, although the upper limit of winter range varies somewhat depending on aspect and snowpack patterns. Winter range areas tend to be dominated by grasslands or shrublands, but often contain timbered areas, especially in draws and on north aspects. Approximately 497,150 acres in the Bitterroot Valley are currently classified as elk winter range. Approximately 48 percent (237,800 acres) of elk winter range in the Bitterroot Valley is on private or state lands, and 52 percent (259,300 acres) is on the Bitterroot National Forest {Project File document WILD-040.pdf}. Winter range on private lands tends to offer better foraging opportunities for elk, whereas winter range on the Bitterroot National Forest tends to offer more cover opportunities.

A number of existing motorized closures in elk winter range designed to limit disturbance to wintering elk were established prior to the current Forest Plan. Elk winter range and existing over-snow vehicle closures are displayed on a map in the Project File {Project File document WILD-160.pd}. Over-snow vehicle use on elk winter range is generally limited by a lack of consistent snowpack, although such use does occur near the upper boundaries of winter range in some areas, such as Tepee Creek.

Table 3.5-36 displays the acres and percentage of identified elk winter range open and closed to over-snow vehicle use on the Bitterroot National Forest for the existing condition {Project File document WILD-071.pdf}.

Table 3.5- 36: Acres and Percentage of Elk Winter Range on the Montana portion of the Bitterroot National Forest Open and Closed to Over-snow Vehicle Use, Existing Condition

BNF (MT) Elk Winter Range	
Acres and (%) Open to Over-snow Vehicles	194,549 Ac. (75.0%)
Acres and (%) Closed to Over-snow Vehicles	64,770 Ac. (25.0%)

Direct and Indirect Effects of the Alternatives by Evaluation Criteria

Summer

Elk Habitat Effectiveness

Open road densities were calculated for third-order drainages across the Forest following implementation of the alternatives utilizing GIS and updated road status data contained in the INFRA database, as described under the

Existing Condition section. The results of open road density calculations within individual third- order drainages for all four alternatives are contained in {Project File documents WILD-055.pdf to 058.pdf}, but are not displayed here since there are several hundred third-order drainages. Rather, the results were summarized by the number of drainages meeting and not meeting the EHE standard (as determined by open road densities) across the entire Forest {Project File document WILD-053.pdf}, and are displayed below in Table 3.5-37. These results were then mapped to show the spatial relationship of drainages that meet or do not meet the EHE standard {Project File documents WILD-110.pdf to 113.pdf}. This analysis excluded third-order drainages within Designated Wilderness, as EHE in those areas is assumed to be 100 percent, and will not change.

Table 3.5- 37: Number of Third-Order Drainages That Meet and Do Not Meet the EHE Standard

Alternative #	# Third-Order Drainages in Compliance with EHE Standard	# Third –Order Drainages Out of Compliance with EHE Standard
1	276	110
2	275	111
3	274	112
4	316	70

Table 3.5-37 shows that **Alternative 1** would bring one additional third-order drainage into compliance with the Forest Plan EHE standard. **Alternative 3** would reduce the number of third-order drainages meeting the Forest Plan EHE standard by one. **Alternative 4** would bring 41 additional third-order drainages into compliance with the Forest Plan standard. Changes in road travel status under **Alternatives 1 and 3** would have only minor effects on the number of third-order drainages meeting the Forest Plan EHE standard. Extensive road closures proposed under **Alternative 4** would have a much greater effect on the number of third-order drainages meeting this standard. However, **all of the alternatives** would leave a number of third-order drainages out of compliance with the Forest Plan EHE standard. As a result, implementation of any of the alternatives would require a project-specific Forest Plan amendment. See FEIS Chapter 3, Section 3.5.7 for a discussion.

Table 3.5-38 shows the expected EHE percentages following implementation of the four proposed alternatives summarized on a hunting district basis {Project File document WILD-054.pdf}. Open road densities shown in this table include only those roads open to full-sized vehicles during some portion of the year, as specified in Lyon (1983).

Table 3.5- 38: Elk Habitat Effectiveness Percentages by Hunting District Following Implementation of the Alternatives

HD Number	Alt. 1	Alt. 1	Alt. 2	Alt. 2	Alt. 3	Alt. 3	Alt. 4	Alt. 4
Hunting District Number and (Area)	**Open Road Density (miles/sq. mile)**	**EHE %**	**Open Road Density**	**EHE %**	**Open Road Density**	**EHE %**	**Open Road Density**	**EHE %**
204 (28.5 Sq. Miles)	2.1	49%	2.4	46%	2.4	46%	1.9	51%
240 (481.1 Sq. Miles)	0.3	83%	0.3	83%	0.3	83%	0.3	83%
250 (664.9 Sq. Miles)	0.7	69%	0.8	65%	0.8	65%	0.4	80%
261 (118.5 Sq. Miles)	0.9	63%	0.9	63%	1.0	60%	0.3	84%

HD Number	Alt. 1	Alt. 1	Alt. 2	Alt. 2	Alt. 3	Alt. 3	Alt. 4	Alt. 4
Hunting District Number and (Area)	**Open Road Density (miles/sq. mile)**	**EHE %**	**Open Road Density**	**EHE %**	**Open Road Density**	**EHE %**	**Open Road Density**	**EHE %**
270 (466.0 Sq. Miles)	1.1	59%	1.2	58%	1.2	58%	0.9	61%
Entire BNF (MT portion) (1759.2 Sq. Miles)	0.7	69%	0.8	66%	0.8	66%	0.5	76%

Table 3.5-38 shows that there would be differences in EHE percentages between the alternatives at both the hunting district and the Forest-wide scale when considering only open roads in the calculations. Changes in EHE percentages would result from implementing year-round closures on roads that are currently open to full-sized vehicle use either year-round or seasonally, or from opening roads that are currently closed.

Alternative 1

The EHE percentage across the Montana portion of the Forest would increase by about 4.5 percent under **Alternative 1**, with most of the improvement occurring in HDs 204 and 250. Elk habitat effectiveness percentages in all HDs, except HD 204, and at the Forest level, would exceed the recommended minimum amount (Lyon 1983) when evaluated at these larger scales, although some third-order drainages within each HD would not meet the EHE standard in the Forest Plan. Changes in EHE percentage under **Alternative 1** are expected to have only minor influences on elk population numbers. Road closures are widely distributed, and are generally not concentrated within any particular elk herd unit. Because of this dilution of the benefits of road closures, changes in EHE percentages under this alternative are unlikely to have a measureable effect on total elk population numbers in the Bitterroot drainage.

Alternative 2

Elk habitat effectiveness percentages would not change under **Alternative 2** at either the Forest or the HD scale. Elk habitat effectiveness percentages in all HDs, except HD 204, and at the Forest level, would exceed the recommended minimum amount (Lyon 1983) when evaluated at these larger scales, although some third-order drainages within each HD would continue to not meet the EHE standard in the Forest Plan. Changes in elk population numbers in the Bitterroot drainage would not be the result of changes in EHE percentages.

Alternative 3

The EHE percentage across the Montana portion of the Forest would not change under **Alternative 3**, but would decline slightly in HD 261. Elk habitat effectiveness percentages in all HDs except HD 204, and at the Forest level would exceed the recommended minimum amount (Lyon 1983) when evaluated at these larger scales, although some third-order drainages within each HD would not meet the EHE standard in the Forest Plan. Changes in EHE percentage under **Alternative 3** are expected to have only minor influences on elk population numbers. Roads whose status would change are widely distributed, and are generally not concentrated within any particular elk herd unit. Because of this dilution of effects, changes in EHE percentages under this alternative are unlikely to have a measureable effect on total elk population numbers in the Bitterroot drainage.

Alternative 4

The EHE percentage across the Montana portion of the Forest would increase by about 15 percent under **Alternative 4**, with substantial improvement occurring in HDs 204, 250, and 261, and modest improvement in HD 270. Elk habitat effectiveness percentages in all hunting districts and at the Forest level would exceed the recommended minimum amount (Lyon 1983) when evaluated at these larger scales, although some third-order drainages within each hunting district would not meet the EHE standard in the Forest Plan. These relatively substantial increases in EHE in several of the hunting districts, and at the Forest-wide scale, would result from closing about 438 miles of roads that are currently classified as open. The widespread increases in EHE percentages under **Alternative 4** would be strongly positive for elk populations. However, it would still be difficult to quantify whether any future changes in elk populations were the direct result of changes in EHE because so many other factors influence elk populations.

Elk Habitat Effectiveness Index

Open route densities were calculated for third-order drainages across the Forest using GIS and updated road and trail status data contained in the INFRA database, as described under the Existing Condition section. The results of open route density calculations following implementation of all four alternatives are contained in the Project File {Project File documents WILD-114.pdf to 117.pdf}, but are not displayed here since there are several hundred individual third-order drainages. Rather, the results were summarized by the number of drainages that would meet and not meet the hypothetical "EHE Index Guideline" across the entire Forest {Project File document WILD-053.pdf}. The results are displayed below, in Table 3.5-39. These results were then mapped to show the spatial relationship of drainages that meet or do not meet the EHE Index Guideline when including both open roads and trails in the calculations {Project File documents WILD-118.pdf to 121.pdf}. This analysis excluded third-order drainages within designated Wilderness, as the EHE Index in those areas is assumed to be 100 percent, and will not change.

Table 3.5- 39: Number of Third-Order Drainages that Meet and Do Not Meet the Hypothetical EHE Index "Guideline"

Alternative #	# Third-Order Drainages that Meet EHE Index "Guideline"	# Third-Order Drainages that Do Not Meet EHE Index "Guideline"
1	211	175
2	174	212
3	170	216
4	300	86

Table 3.5-39 shows that **Alternative 1** would result in 37 additional third-order drainages meeting the hypothetical EHE Index Guideline. **Alternative 3** would reduce the number of third-order drainages meeting the hypothetical EHE Index Guideline by four. **Alternative 4** would result in 126 additional third-order drainages meeting the hypothetical EHE Index Guideline.

Table 3.5-40 displays the EHE Index percentages following implementation of the four proposed alternatives summarized on a hunting district basis {Project File document WILD-059.pdf}. Open route densities shown in this table include roads or trails open to any type of motorized vehicle during some portion of the year, which is a departure from Lyon (1983). This table reflects the potential effects of motorized use to elk regardless of the type of route or the type of vehicle, based on the assumption that OHV use of trails has similar effects to elk as full-sized vehicle use on roads (see discussion in Section 3.5.5 (A).

Table 3.5- 40: Elk Habitat Effectiveness Index Percentages by Hunting District Following Implementation of the Alternatives

HD Number	Alt. 1	Alt. 1	Alt. 2	Alt. 2	Alt. 3	Alt. 3	Alt. 4	Alt. 4
Hunting District Number and (Area)	Open Route Density (miles/sq. mile)	EHE %	Open Route Density (miles/sq. mile)	EHE %	Open Route Density (miles/sq. mile)	EHE %	Open Route Density (miles/sq. mile)	EHE %
204 (28.5 Sq. Miles)	2.7	43%	3.2	38%	3.4	36%	1.9	51%
240 (481.1 Sq. Miles)	0.3	85%	0.4	78%	0.4	78%	0.3	85%

HD Number Hunting District Number and (Area)	Alt. 1 Open Route Density (miles/sq. mile)	Alt. 1 EHE %	Alt. 2 Open Route Density (miles/sq. mile)	Alt. 2 EHE %	Alt. 3 Open Route Density (miles/sq. mile)	Alt. 3 EHE %	Alt. 4 Open Route Density (miles/sq. mile)	Alt. 4 EHE %
250 (664.9 Sq. Miles)	1.4	56%	1.6	54%	1.6	54%	0.5	76%
261 (118.5 Sq. Miles)	1.0	60%	1.4	56%	1.5	55%	0.3	84%
270 (466.0 Sq. Miles)	1.8	52%	2.0	50%	2.0	50%	1.1	59%
Entire BNF (MT portion) (1759.2 Sq. Miles)	1.2	58%	1.4	56%	1.4	56%	0.6	72%

Table 3.5-40 shows that there are substantial differences in the EHE Index between some alternatives at both the hunting district and Forest-wide scales when considering both roads and trails open to motorized use in the calculations. Changes in EHE Index percentages would result from implementing year-round closures on roads or trails that are currently open to motorized vehicle use either year-round or seasonally, or from opening roads or trails that are currently closed year round to motorized use.

Alternative 1

The EHE Index percentage across the Montana portion of the Forest would increase by about 3.5 percent under **Alternative 1**, with improvement spread fairly evenly among all the hunting districts. Increases in the EHE Index under **Alternative 1** would positively influence elk numbers to some degree by increasing the effectiveness of elk habitat through reducing the risk of human disturbance to elk. Changes in the EHE Index percentage under **Alternative 1** are expected to have only minor influences on elk population numbers. Road and trail closures are widely distributed, and are generally not concentrated within any particular elk herd unit. Because of this dilution of the benefits of road and trail closures, changes in EHE Index percentages under this alternative are unlikely to have a measureable effect on total elk population numbers in the Bitterroot drainage.

Alternative 2

The EHE Index percentage would not change at the Forest scale or in any of the hunting districts under **Alternative 2**. Changes in elk population numbers in the Bitterroot drainage would not be the result of changes in EHE Index percentages.

Alternative 3

The EHE Index percentage across the Montana portion of the Forest would not change under **Alternative 3**, but would decline slightly in HDs 204 and 261. **Alternative 3** would negatively influence elk populations to some degree by reducing the effectiveness of elk habitat through increasing the risk of human disturbance to elk. Changes in the EHE Index percentage under **Alternative 3** are expected to have only minor influences on elk population numbers. Reductions in road and trail closures are widely distributed, and are fairly minor. Because of this dilution of the impacts of opening more roads and trails to motorized use, changes in EHE Index percentages under this alternative are unlikely to have a measureable effect on total elk population numbers in the Bitterroot drainage.

Alternative 4

The EHE Index percentage across the Montana portion of the Forest would increase by about 29 percent under **Alternative 4**, with substantial improvement occurring in all HDs. Increases in the EHE Index percentage under **Alternative 4** would be strongly positive for elk populations. However, it would still be difficult to quantify whether any future changes in elk populations were the direct result of changes in EHE Index percentages because so many other factors influence elk populations.

Elk Security Area (Rifle Season)

Elk security areas have been mapped within the Bitterroot National Forest portion of hunting districts using the criteria from Hillis et al. (1991). Maps for the four alternatives are in {Project File documents WILD-123.pdf to

130.pdf}. Table 3.5-41, below, displays adjusted elk security area percentages during the Montana rifle season for the alternatives by hunting district and across the Montana portion of the Forest {Project File document WILD-122.pdf}, using the assumptions described for Elk Security Area under the Existing Condition section.

Table 3.5- 41: Elk Security Area Percentage during the Montana Rifle Season by Hunting District Following Implementation of the Alternatives

HD Number	Alt. 1	Alt. 1	Alt. 2	Alt. 2	Alt. 3	Alt. 3	Alt. 4	Alt. 4
Hunting District Number and (Area)	**Security Area Acres**	**Security Area %**	**Security Area Acres**	**Security Area %**	**Security Area Acres**	**Security Area %**	**Security Area Acres**	**Security Area %**
204 (18,266 Acres)	3,393	18.6	951	5.2	951	5.2	4,638	23.9
240 (307,936 Acres)	55,221	17.9	53,580	17.4	50,521	16.4	56,663	18.4
250 (425,567 Acres)	101,607	23.9	76,687	18.0	87,348	20.5	127,571	30.0
261 (75,866 Acres)	25,502	33.6	12,321	16.2	23,240	30.6	33,782	44.5
270 (298,245 Acres)	60,454	20.3	41,866	14.0	45,764	15.3	75,073	25.2
Entire BNF MT portion) (1,125,879 Acres)	246,176	21.9	185,403	16.5	207,823	18.5	297,455	26.4

Table 3.5-41 shows that there are substantial differences in the Elk Security Area percentage between some alternatives on a hunting district scale and on the Forest scale when considering both roads and trails open to motorized use in the calculations. Most of the increases in Elk Security Area are the result of closing motorized trails during the rifle season in recommended wilderness, WSAs, and/or IRAs, depending on the alternative.

Alternative 1

Elk Security Area percentage across the Montana portion of the Forest would increase by about 33 percent under **Alternative 1**, with most of the increase located in HDs 250, 261, and 270. The security area percentage in HD 261 would exceed the recommended minimum amount. Security area percentages in all the other hunting districts, and at the Forest level, would improve substantially, but would remain below the recommended amount. This increase in security area percentage in many areas across the Forest would reduce elk vulnerability to hunting mortality to some extent, which would help elk herds recover in some areas where numbers have been below objectives.

Alternative 2

The security area percentage would not change at the Forest scale or in any of the hunting districts under **Alternative 2**. Security area percentages would remain well below the recommended level in all hunting districts and at the Forest-wide scale. Elk would remain highly vulnerable to hunting mortality, which could continue to suppress elk numbers in many areas across the Forest.

Alternative 3

The security area percentage across the Montana portion of the Forest would increase by about 12 percent under **Alternative 3**, with moderate increases located in HDs 250 and 261, and a small increase in HD 270. Security area percentage would decrease a small amount in HD 240. The security area percentage in HD 261 would meet the recommended minimum amount, while the percentages in the other hunting districts and at the Forest level would remain well below the recommended amount. These relatively small increases would probably have only minor impacts to elk vulnerability, and would be unlikely to have quantifiable effects on elk population numbers.

Alternative 4

The security area percentage across the Montana portion of the Forest would increase by about 60 percent under **Alternative 4**, with substantial increases located in HDs 204, 250, 261, and 270, and a small increase in HD 240. The security area percentage in HDs 250 and 261 would meet the recommended minimum amount, while the percentages in HDs 240 and 270 and at the Forest scale would approach the recommended amount. This large increase in security area percentage in many areas across the Forest would substantially reduce elk vulnerability to hunting mortality, which would help elk herds increase across the Forest.

Elk Security Area Index (Archery Season)

Estimates of elk security area index percentages by hunting district were derived using GIS, based on the assumptions described for this index under the Existing Condition section. Maps for Alternatives 1 – 4 are in {Project File documents WILD-132 to 139.pdf}. GIS tables showing acres of security area based on these maps are summarized in {Project File document WILD-131.pdf}. Table 3.5-42, below, displays the elk security area index percentages by hunting district and across the Montana portion of the Forest following implementation of the four alternatives.

Table 3.5- 42: Elk Security Area Index during the Montana Archery Season by Hunting District Following Implementation of the Alternatives

HD Number Hunting District Number and (Area)	Alt. 1 Security Area Acres	Alt. 1 Security Area %	Alt. 2 Security Area Acres	Alt. 2 Security Area %	Alt. 3 Security Area Acres	Alt. 3 Security Area %	Alt. 4 Security Area Acres	Alt. 4 Security Area %
204 (18,266 Acres)	3,330	18.2	399	2.2	0	0.0	4,303	23.6
240 (307,936 Acres)	54,040	17.5	52,550	17.1	50,014	16.2	55,481	18.0
250 (425,567 Acres)	69,828	16.4	52,048	12.2	50,087	11.8	118,818	27.9
261 (75,866 Acres)	21,138	27.9	10,453	13.8	18,651	24.6	33,200	43.8
270 (298,245 Acres)	48,898	16.4	30,701	10.3	33,398	11.2	66,897	22.4
Entire BNF (MT portion) (1,125,879 Acres)	197,234	17.5	146,151	13.0	152,149	13.5	278,699	24.8

Table 3.5-42 shows that there are substantial differences in elk security area index percentages between the alternatives on a hunting district scale and on the Forest scale when considering both roads and trails open to motorized use in the calculations. Increases in elk security area index percentages would result from extending the existing seasonal closures on a number of roads to include the archery season, or prohibiting motorized use on some trails during the archery season that are currently open to motorized use either year round or outside the rifle season, or both. Many of the motorized trails that would be closed during the archery season are in recommended wilderness, WSAs, or IRAs. Archery season road and trail closures are intended to reduce hunting pressure on elk during the early fall period. Reducing hunting pressure at this time of year may help to delay early migration of elk from summer ranges to private winter ranges before the rifle season starts, which would make more elk available to hunters on Bitterroot National Forest lands during the early part of the rifle season. Alternatives with higher security area index percentages would likely be more effective in reducing the tendency of elk to migrate to winter ranges on private land prior to the rifle season.

Alternative 1

The elk security area index percentage across the Montana portion of the Forest would increase by about 35 percent under **Alternative 1**, with substantial increases located in HDs 204, 250, 261, and 270, and a minor increase in HD 240. The security area index percentage would more than double in HD 261, but would remain slightly below the recommended minimum amount. Elk security area index percentages in HDs 204, 250, and 270 would improve considerably, but would remain well under the recommended minimum level. This increase in security area percentage in many areas across the Forest would reduce elk vulnerability to hunting mortality during the archery season to some extent, which would help elk herds recover in some areas where numbers have been below objectives. It would also reduce the tendency of elk to leave summer ranges early and move to private land in an effort to avoid hunting pressure.

Alternative 2

The security area index percentage would not change at the Forest scale or in any of the hunting districts under **Alternative 2**. Security area index percentages would remain well below the recommended level in all hunting districts and at the Forest-wide scale. Elk would remain highly vulnerable to hunting mortality, which could continue to suppress elk numbers in many areas across the Forest. This alternative would not reduce the tendency of elk to leave summer ranges early and move to private land in an effort to avoid hunting pressure.

Alternative 3

The security area index percentage across the Montana portion of the Forest would increase by about 4 percent under **Alternative 3**, with a substantial increase located in HD 261 and a minor increase in HD 270. Security area index percentages would decline slightly in HDs 240 and 250, and would be eliminated in HD 204. The security area index percentage would almost double in HD 261, but would remain somewhat below the recommended minimum amount. Security area index percentages in HDs 240, 250 and 270 would remain well under the recommended minimum. HD204 would no longer provide any elk security area during the archery season. With the exception of HD 261, these relatively small changes would probably have only minor impacts to elk vulnerability, and would be unlikely to have quantifiable effects on elk population numbers. This alternative would not reduce the tendency of elk to leave summer ranges early and move to private land in an effort to avoid hunting pressure, and might even exacerbate that tendency in some cases. **Alternative 3** does not extend any seasonal closures on roads currently open to full-sized vehicles to include the bow season, but does apply an archery season closure to a number of roads and trails currently open to ATVs and/or motorcycles either seasonally or year long. It also opens some routes that are currently closed to all motorized use.

Alternative 4

The security area index percentage across the Montana portion of the Forest would increase by about 91 percent under **Alternative 4**, with substantial increases located in HDs 204, 250, 261, and 270 and a minor increase in HD 240. The security area index percentage would more than triple in HD 261, and would exceed the recommended minimum amount. The security area index percentage in HD 250 would more than double, but would remain slightly below the recommended minimum amount. Security area index percentages in HDs 204 and 270 would improve considerably, but would remain somewhat below the recommended minimum level. This substantial increase in security area index percentages in many areas across the Forest would reduce elk vulnerability to hunting mortality during the archery season to a large extent, which would help elk herds recover in some areas where numbers have been below objectives. It would also reduce the tendency of elk to leave summer ranges early and move to private land in an effort to avoid hunting pressure.

Table 3.5-43 displays the miles of different route types that would be closed to motorized use during the archery season, by alternative {Project File documents WILD-140 to 143.pdf}. All routes closed to motorized use during the archery season would also be closed during the rifle season, and some would be closed through the winter. Routes closed to motorized use year-round or only during the rifle season are not included in these numbers.

Table 3.5- 43: Miles of Roads and Trails Closed to Motorized Use during the Archery Season, by Alternative

Route Type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Miles of roads closed to full-sized vehicles during archery season	26.7	6.4	6.4	41.8
Miles of roads and trails closed to ATVs and motorcycles during archery season	36.6	2.9	18.4	2.8

Route Type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Miles of trails closed to motorcycles during archery season	36.2	0	58.0	0
Miles of proposed trails closed to ATVs and motorcycles during archery season	6.4	0	0	0
Total motorized route miles closed during archery season	105.9	9.2	82.8	44.6

Wildlife Core Security Areas

Table 3.5-44, below, displays wildlife core security area acres and percentages by hunting districts and at the Forest scale for the alternatives {Project File document WILD-070.pdf), using the methodology described under the Wildlife Core Security Areas section under the Existing Condition. Maps for Alternatives 1 – 4 are in {Project File documents WILD-144.pdf to WILD-147.pdf}.

Table 3.5- 44: Wildlife Core Security Area Percentage during the Summer by Hunting District Following Implementation of the Alternatives

HD Number Hunting District Number and Area	Alt. 1 Core Security Area Acres	Alt. 1 Security Area %	Alt. 2 Core Security Area Acres	Alt. 2 Security Area %	Alt. 3 Core Security Area Acres	Alt. 3 Security Area %	Alt. 4 Core Security Area Acres	Alt. 4 Security Area %%
204 (18,266 Acres)	3,080	16.9	1,194	6.5	738	4.0	5,086	27.8
240 (307,936 Acres)	254,844	82.8	250,080	81.2	239,301	77.7	260,013	84.4
250 (425,567 Acres)	191,302	45.0	160,252	37.7	154,848	36.4	301,293	70.8
261 (75,866 Acres)	38,303	50.5	19,580	25.8	18,088	23.8	58,890	77.6
270 (298,245 Acres)	107,214	35.9	82,152	27.5	78,857	26.4	158,827	53.3
Entire BNF (MT portion) (1,125,880 Acres)	594,743	52.8	513,258	45.6	491,832	43.7	784,109	69.6

Table 3.5-44 shows that there are substantial differences in the wildlife core security area percentage between the alternatives on a hunting district scale and on the Forest scale when considering both roads and trails open to motorized use in the calculations.

Alternative 1

The wildlife core security area percentage across the Montana portion of the Forest would increase by about 16 percent under **Alternative 1**, with most of the increase located in HDs 250, 261, and 270. Most of this improvement is the result of closing motorized trails year-long in the Blue Joint Recommended Wilderness, parts of the Sapphire WSA, and parts of the Stony Mountain and Reimel-Tolan IRAs. Reducing disturbance to elk in these remote, unroaded areas would have a positive influence on elk populations, and might reduce the tendency of some elk to stay on private winter ranges year-long.

Alternative 2
The wildlife core security area percentages would not change under **Alternative 2** at either the Forest or the hunting district scale. Changes in elk population numbers in the Bitterroot drainage would not be the result of changes in wildlife core security area percentages. This alternative would not reduce the tendency of some elk to stay on private winter ranges year-long.

Alternative 3
The wildlife core security area percentage across the Montana portion of the Forest would decrease by about 4 percent under **Alternative 3,** with small decreases occurring in all hunting districts. Most of this decrease would be the result of allowing motorized use on trails that are currently closed to such use, such as portions of Trail #313, Trail #9, and many of the trails leading from trailheads in the Bitterroot canyons to the Selway-Bitterroot Wilderness. Increasing disturbance to elk in remote, unroaded areas would have a negative influence on elk populations, and might increase the tendency of some elk to stay on private winter ranges year-long.

Alternative 4
The wildlife core security area percentage across the Montana portion of the Forest would increase by about 53 percent under **Alternative 4**, with substantial increases located in HDs 250, 261, and 270, and moderate increases located in HDs 204 and 240. This large increase would be a result of closing motorized trails year-long in recommended wilderness, WSAs, or IRAs, or both, in addition to closing many roads to motorized use year-long. Reducing disturbance to elk in both remote, unroaded areas and currently roaded areas would have a strong positive influence on elk populations, and would likely reduce the tendency of some elk to stay on private winter ranges year-long.

Over-snow

Percentage of Elk Winter Range Open to Over-snow Vehicle Use

Table 3.5-45 displays the acres and percentage of identified elk winter range open and closed to over-snow vehicle use on the Bitterroot National Forest under the alternatives {Project File document WILD-071.pdf}.

Table 3.5- 45: Acres and Percentage of Elk Winter Range on the Bitterroot National Forest Open and Closed to Over-snow Vehicle Use for the Alternatives

BNF Elk Winter Range	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Acres and (%) Open to Over-snow Vehicles	180,205 Ac. (69.5%)	194,549 Ac. (75.0%)	196,110 Ac. (75.6%)	163,179 Ac. (62.9%)
Acres and (%) Closed to Over-snow Vehicles	79,114 Ac. (30.5%)	64,770 Ac. (25.0%)	63,209 Ac. (24.4%)	96,140 Ac. (37.1%)

Table 3.5-45 shows that there are some differences between the alternatives in the amount of elk winter range open to over-snow vehicle use across the Montana portion of the Forest. Reducing the amount of elk winter range open to over-snow vehicle use is considered beneficial to elk. Wintering elk are already under considerable metabolic stress due to lack of adequate forage. Disturbance during the winter can increase elk movement rates and stress levels, both of which cause elk to use fat reserves that are important for survival and successful calf production,

Alternative 1
Alternative 1 would reduce the area of elk winter range open to over-snow vehicle use by about 7 percent. Reductions in the acreage of elk winter range available for such use would occur in some lower elevation areas within recommended wilderness, lower elevation areas in the Stony Mountain and Selway-Bitterroot IRAs, and the Tepee Creek area {Project File document WILD-161.pdf}. These reductions in the acreage of elk winter range available for over-snow vehicle use would be somewhat beneficial to elk, but are unlikely to produce quantifiable increases in elk population numbers.

Alternative 2

Alternative 2 would not change the area of elk winter range open to over-snow vehicle use. There would be no change in the potential for motorized disturbance to elk on winter ranges.

Alternative 3

Alternative 3 would increase the area of elk winter range open to over-snow vehicle use by about1 percent. This increase would occur within the existing Upper Birch Creek and Canyon Creek area closures that are being dropped in **Alternatives 1 and 3** {Project File document WILD-162.pdf}. These increases in over-snow vehicle access to elk winter range would be somewhat detrimental to elk, but are unlikely to result in quantifiable decreases in elk population numbers.

Alternative 4

Alternative 4 would reduce the area of elk winter range open to over-snow vehicle use by about 16 percent. Reductions in the acreage of elk winter range available for such use would occur in the same areas listed under **Alternative 1**, with the addition of some winter range closures in the Allen Mountain IRA {Project File document WILD-163.pdf}. These reductions in the acreage of elk winter range would be somewhat beneficial to elk, but are unlikely to produce quantifiable increases in elk population numbers.

Ridge Top Trails in the Travel Plan

Backcountry trails were often constructed on ridge tops or in creek bottoms because those were generally the easiest travel routes. Many ridge top trails in elk summer range on the BNF are currently open to motorized vehicles (typically motorcycles). Motorized trails on ridge tops, especially in alpine and/or elk summer range, could have a disproportionate effect on elk and other wildlife species because disturbance and noise resulting from motorized vehicles can disturb animals in basins on either side of the ridge. Effects of this disturbance could include displacing elk and other species from summer ranges to winter ranges on private lands prior to the hunting season, where elk become unavailable to most hunters (See discussion on FEIS 3.5-91 to 95).

Table 3.5-46 displays the number of trail miles on ridge tops that are open to motorized use in elk summer range in the existing condition and under Alternative 1 (Modified), by District.

Table 3.5- 46: Miles of Ridge Top Trail in Elk Summer Range Open to Motorized Use

Alternative 2			
District	**Total Open Trail Miles**	**Miles Single-Track**	**Miles Double-Track**
Stevensville	26.8	25.5	1.2
Darby	24.7	24.7	0.0
Sula	77.9	62.1	15.8
West Fork	72.7	65.3	7.4
Totals:	202.1	177.6	24.4
Alternative 1 (Modified)			
District	**Total Open Trail Miles**	**Miles Single-Track**	**Miles Double-Track**
Stevensville	12.6	0.0	12.6
Darby	11.1	11.1	0.0
Sula	18.8	16.2	2.6
West Fork	25.6	19.4	6.2
Totals:	68.1	46.7	21.4

Table 3.5-46 shows that Alternative 1 (Modified) would prohibit motorized use on a number of ridge top trails in elk summer range. Total miles of ridge top trails in elk summer range across the BNF would decrease by about 134 miles, or about 66% of the total currently open to motorized use. Examples of ridge top trails in elk summer range where motorized use would be prohibited include Palisade Mountain #44, Chain of Lakes #39, Hole in the Wall #434, Reimel Tolan Divide #78, Wiles Peak #56 and most of Razorback Ridge #106. These and other changes would reduce the potential of displacing elk and other wildlife in many areas in elk summer range.

Relationship of suggested ridge top trails in IRAs to elk habitat (trails brought up during the Objection Process on the April 2015 Draft ROD)

Trail 161 (Bald Top Mountain)

This trail generally follows the ridge that separates the Sleeping Child Creek and Two Bear Creek drainages, and bisects the Sleeping Child IRA. All of the area crossed by this trail is classified as elk summer range. The portion of the trail from Sleeping Child Creek to Bald Top Mountain and beyond for an additional mile to the south burned at moderate to high severity during the fires of 2000. Conifer recovery has been limited. This portion of the trail offers little hiding or thermal cover for elk, but provides foraging habitat. It is not classified as security area due to the lack of hiding cover, as well as the presence of the motorized trail open during the rifle season. The portion of the trail from one mile south of Bald Top Mountain east to Road 62726 was burned in places, but is generally still forested. This area is generally too open to provide thermal cover, but does provide hiding cover and forested forage. It is not currently classified as security cover due to the presence of the trail which is open to motorized use during the rifle season.

Currently, Trail 161 is open to motorcycle use year-long. Under Alternative 1 (Modified), Trail 161 would be open to motorcycles from June 16 to August 30. It would be closed to motorized use during the archery and rifle hunting seasons, and through the winter. This seasonal closure would expand the area classified as elk security along much of the trail. It would also reduce displacement of elk from summer ranges on public lands to winter ranges on private lands prior to the rifle season. It responds to public comments citing user conflicts during the archery season.

Trail 160 (Bald Top – Sleeping Child)

This trail begins at Trail 105 about ¼ mile east of the junction of Sleeping Child and Divide Creeks, and generally follows a minor ridge up to the main ridge separating the Sleeping Child Creek and Two Bear Creek drainages, where it meets Trail 161 about one mile south of Bald Top Mountain. The area bisected by this trail is within the Sleeping Child IRA, and is all classified as elk summer range. The area crossed by the trail burned at moderate to high severity during the fires of 2000. Conifer recovery has been limited. This area offers little hiding or thermal cover for elk, but provides foraging habitat. It is not classified as elk security area due to the lack of hiding cover.

Currently, Trail 160 is open to motorcycle use year-long. Under Alternative 1 (Modified), Trail 160 would be open to motorcycles from June 16 to August 30. It would be closed to motorized use during the archery and rifle hunting seasons, and through the winter. This seasonal closure would reduce displacement of elk from summer ranges on public lands to winter ranges on private lands prior to the rifle season. It also responds to public comments citing user conflicts during the archery season.

Trail 288 (White Stallion Camp)

This trail runs from its junction with Trail 104 at White Stallion Camp down to its junction with Trail 84 along Sleeping Child Creek. This trail begins on a very broad ridge, but then drops down a slope into a creek bottom. Only the lower half of the trail is within the Sleeping Child IRA. The area crossed by the trail is all classified as elk summer range. It burned at moderate to high severity during the fires of 2000. Conifer recovery has been limited. This area offers little hiding or thermal cover for elk, but provides foraging habitat. It is not classified as elk security area due to the lack of hiding cover and the presence of the trail which is open to motorized use during the rifle season.

Currently, Trail 288 is open to motorcycle use year-long. Under Alternative 1 (Modified), Trail 288 would be open to motorcycles from June 16 to August 30. It would be closed to motorized use during the archery and rifle hunting seasons, and through the winter. This seasonal closure would reduce displacement of elk from summer ranges on public lands to winter ranges on private lands prior to the rifle season. It also responds to public comments citing user conflicts between bow and rifle hunters.

Trail 601 (Shook Mountain)

This trail follows the ridge that separates the East Fork and West Fork Bitterroot River drainages from its northern terminus on Road 731 south to Medicine Point and beyond to the upper end of the road system in Warm Springs Creek. Most of this trail is within the Allan Mountain IRA. The portion generally north of Shook Mountain is classified as elk winter range, and is mostly forested. The portion south of Shook Mountain is classified as elk summer range. Most of this portion is either naturally open or burned during the Rombo fire in 2007. This area offers little hiding or thermal cover for elk, but provides foraging habitat. Areas adjacent to the trail do not qualify as elk security area due to the presence of the trail that is open to motorized use during hunting season. Some adjacent areas to the west in the upper Piquett Creek drainage do qualify as security area.

Trail 601 is currently open to motorcycle use year-long, which would remain unchanged under Alternative 1 (Modified). Motorized use on this trail could continue to displace elk from public summer range to private winter range prior to and during hunting seasons.

Trail 177 (Warm Springs Ridge)

This trail follows the ridge that separates the Warm Springs Creek and Maynard Creek drainages, and further south, the Warm Springs Creek and Camp Creek drainages. Its north terminus is on Warm Springs Road 370 just south of Hwy. 93. Its south terminus is on Road 5734 near Saddle Mountain. The southern two- thirds of this trail are within the Allan Mountain IRA. The northern third is outside the IRA. The northern half of the portion outside the IRA is classified as elk winter range. The rest of the trail crosses elk summer range. Much of the area immediately on either side of this long ridge is open grasslands, although some areas were burned during the fires of 2000. There are some forested patches along the ridge where the aspect is favorable, and some forested basins in the IRA to the west of the trail. Areas to the east of the ridge are mostly either naturally open or were recently burned, with only scattered forested patches. The forested patches in basins on either side of the ridge provide some hiding and/or thermal cover in a mosaic dominated by foraging area. Most of the area traversed by the trail is not classified as security area due to the lack of cover near the ridge, and, in the southern half, the motorized status of the trail during rifle season. Many of the adjacent basins in tributaries of upper Warm Springs Creek do provide security areas.

The northern half of Trail 177 is currently open to motorcycle use from December 1 to October 14, but closed during rifle season. The southern half is currently open to motorcycle use year round. Under Alternative 1 (Modified), the status of the northern half of the trail would remain unchanged. However, the southern half of the trail would be closed to motorized use during the rifle season. This seasonal closure of the southern half of the trail to motorized use during the rifle season would result in additional areas classified as elk security. It would also reduce displacement of elk from summer ranges on public lands to winter ranges on private lands to some extent, although such displacement often happens due to motorized use prior to the archery season. This closure would also make the season of motorized use on this section of the trail consistent with other trails in the area.

Trail 55 (Little Boulder Creek)

This trail follows Little Boulder Creek for most of its length, and is thus not a ridge top trail. The last mile of the trail is on the ridge between Rombo Mountain and Piquett Mountain. Most of this trail is in the Allan Mountain IRA. The western half is within elk winter range, while the eastern half is within elk summer range. The winter range portion of the trail is generally heavily forested and provides thermal and hiding cover. The summer range portion of the trail burned in the Rombo fire in 2007, and currently provides foraging area with many snags and down trees that may provide some hiding cover. None of the area immediately adjacent to this trail is currently classified as security area due to the presence of the trail which is open to motorized use during the rifle season.

Currently, Trail 55 is open to motorcycle use year-long. Under Alternative 1 (Modified), Trail 55 would be open to motorcycles from December 2 to October 14, but closed during the rifle hunting season. This seasonal closure during the rifle season would expand the area classified as elk security along much of the trail. It would also reduce displacement of elk from summer ranges on public lands to winter ranges on private lands to some extent, although such displacement often happens due to motorized use prior to the archery season.

Trail 676 (Piquett Divide, aka Rombo Mountain)

This trail follows the ridge that separates the West Fork Bitterroot River and Piquett Creek drainages. The trailhead is near the end of Road 5720, and the trail terminates at its junction with Trail 55 in the saddle between Rombo and Piquett Mountains. The southern half of this trail is within the Allan Mountain IRA, while the northern half of the trail is outside the IRA. The northern 1.5 miles of the trail are classified as elk winter range, while the rest of the trail is elk summer range. The portion of the trail in winter range is heavily forested and likely provides both thermal and hiding cover. As the trail enters summer range, patches of forest become more scattered and more open, creating a mosaic of cover and foraging habitat. The trail then enters the area burned in the Rombo fire in 2007. Initially, burned area is mostly confined to the basins to the east of trail, but the southern half of the trail passes through an area where fire burned on both sides of the trail. These areas currently provide foraging habitat, but hiding cover is limited to that provided by snags and down logs. None of the area adjacent to the trail is classified as security area due to the presence of the trail which is open to motorized use during the rifle season.

Currently, Trail 676 is open to motorcycle use year-long. Under Alternative 1 (Modified), Trail 676 would be open to motorcycles from December 2 to October 14, but closed during the rifle season. This seasonal closure during the rifle season would expand the area classified as elk security along much of the trail. It would also reduce displacement of elk from summer ranges on public lands to winter ranges on private lands to some extent, although such displacement often happens due to motorized use prior to the archery season.

Trail 248 (Drop Creek)

This trail follows the ridge that separates the Slate Creek and Overwhich Creek drainages to the south and the Warm Springs Creek drainage to the north. The trail begins at the junction of Trails 673 and 103 in the saddle between Overwhich Falls and Pass Lake, and terminates at its junction with Trail 55 west of Piquett Lake. This trail is essentially in the middle of the Allan Mountain IRA. The entire trail is classified as elk summer range. Two miles or so on either end of the trail burned at high severity during the Rombo fire in 2007, and currently provide foraging habitat but no cover. The middle several miles of the trail pass through classic elk summer range composed of moderately dense sub-alpine forest interspersed with many small, mesic openings in the upper basins on either side of the trail. This area provides a mix of hiding cover, thermal cover and foraging habitat. This middle section of the trail is classified as security area. The burned sections of either end of the trail are not classified as security area due to the lack of hiding cover.

Currently, Trail 248 is open to ATV use from 12/2 to 10/14 from its junction with Trail 182 east to its junction with Trails 673 and 103. Trail 248 is currently open to motorcycle use from 12/2 to 10/14 from its junction with Trail 182 west to its junction with Trail 55 near Piquett Lake. The existing seasonal closures during the rifle season would continue under Alternative 1 (Modified). These seasonal closures help reduce displacement of elk from summer ranges on public lands to winter ranges on private lands to some extent, although such displacement often happens due to motorized

Direct and Indirect Effects to Elk Summarized by Alternative

Effects Common to All Action Alternatives

All of the action alternatives would remove the existing motorized restrictions in the Upper Birch Creek area closure, which is all within elk winter range. The Upper Birch Creek closure is fairly steep and heavily roaded, and contains a number of old harvest units that resemble clearcuts. Elk that winter on private lands below the Forest boundary probably use this area to some extent, especially for thermal cover. The potential for over-snow vehicle use is limited because of the terrain and the relative lack of snow, although adequate snow undoubtedly exists in the area at times to allow such use on the roads. Conflicts between elk and over-snow vehicles in this area would likely be limited because elk would tend to stay on the adjacent, lower elevation private lands during those times when sufficient snow existed on the Forest to allow much over-snow vehicle use.

Alternative 1

Elk Habitat Effectiveness

Road closures included in **Alternative 1** would bring one additional third-order drainage into compliance with the Forest Plan EHE standard (Table 3.5-37). On a broader scale, these road closures would increase EHE a small amount from the existing condition in three hunting districts and at the Forest-wide scale. (Table 3.5-38). These minor improvements in EHE would be positive for elk, but would not be expected to result in any quantifiable effects to elk populations.

Elk Habitat Effectiveness Index

Additional road and motorized trail closures included in **Alternative 1** would result in 37 additional third- order drainages meeting the hypothetical EHE index guideline (Table 3.5-39). On a broader scale, these closures would improve the EHE index by several percentage points in all five hunting districts and across the Forest as a whole (See Table 3.5-40). Widespread but modest improvements in the EHE index would be positive for elk, but would not be expected to result in quantifiable effects to elk population numbers or herd structure.

Elk Security Area (Rifle Season)

Additional road and motorized trail closures that are included in **Alternative 1** would increase the amount of elk security area during the rifle season in all five hunting districts and across the Forest as a whole (See Table 3.5-41).

Security area would more than triple in HD 204, double in HD 261, and increase by about 30-50 percent in HDs 250 and 270. Security area in HD 240 would only increase by a small amount, because most of this hunting district is in wilderness, and there are few opportunities to increase security area by closing roads or trails. The amount of security area across the Forest would increase by about 33 percent. Substantial increases in security area throughout the Forest may reduce elk vulnerability to harvest during the rifle season, which in turn could potentially increase bull carryover and the total size of the elk herds.

Elk Security Area Index (Archery Season)

Road and motorized trail closures that are included in **Alternative 1** would increase the amount of elk security area during the archery season in all five hunting districts and across the Forest as a whole (See Table 3.5-42). Elk security area would increase by over 700 percent in HD 204, double in HD 261, and increase by about 34-59 percent in HDs 250 and 270. Elk security area in HD 240 would only increase by a small amount, because most of this hunting district is in the Selway-Bitterroot Wilderness or adjacent recommended wilderness or other areas without roads, and there are few opportunities to increase the security area index by closing roads or trails. Elk security area across the entire Forest would increase by about 35 percent. Substantial increases in security areas throughout the Forest during the archery season may reduce elk vulnerability to harvest during the archery season, and may reduce the tendency of some herds to move out of summer ranges during the archery season to seek refuge from hunting pressure on private winter ranges. Elk that remain on summer ranges through the archery season due to reduced hunting pressure would more likely be available to hunters on the Forest during the beginning of the rifle season.

Wildlife Core Security Areas

Road and motorized trail closures that are included in **Alternative 1** would increase the wildlife core security area during the summer in all five hunting districts and across the Forest as a whole (See Table 3.5-44). The core security area would almost triple in HD 204, double in HD 261, and increase by about 19-31 percent in HDs 250 and 270. Core security area in HD 240 would only increase by a small amount, because most of this hunting district is in the Selway-Bitterroot Wilderness or adjacent recommended wilderness or other areas without roads, and there are few opportunities to increase the core security area by closing roads or trails. The core security area across the entire Forest would increase by about 16 percent. Substantial increases in core security areas throughout the Forest during the summer may improve the health and vigor of some elk herds by reducing the amount of time and energy expended moving away from disturbance. However, disturbance during the summer in the absence of hunting pressure is not likely to cause elk to abandon summer ranges for winter ranges

Percentage of Elk Winter Range Open to Over-snow Vehicle Use

Alternative 1 would prohibit over-snow vehicle use in the Teepee Creek winter range during the winter to reduce disturbance to elk that winter in this area. This closure, plus additional over-snow vehicle over-snow vehicle closures in recommended wilderness and the Stony Mountain and Selway-Bitterroot IRAs {Project File document WILD-161.pdf}, would reduce the percentage of elk winter range on the Forest open to over-snow vehicle use to about 69.5 percent (180,205 acres) in this alternative. Over-snow vehicle use would be prohibited in about 7.4 percent (14,344 acres) of the elk winter range currently open to such use (Table 3.5-45; {Project File document WILD-071.pdf}. Many of the areas included in this total are steep, heavily timbered, and/or rocky, and probably receive little over-snow vehicle use at present. These additional closures would reduce motorized disturbance to wintering elk to some extent, but it would be difficult to quantify any changes to herd numbers or health as a result.

Alternative 2

Elk Habitat Effectiveness

Alternative 2 would not change the existing travel status of roads on the Forest. Therefore, the number of third-order drainages that do not comply with the Forest Plan EHE standard would not change (Table 3.5-37). On a broader scale, the existing EHE would not change in any of the hunting districts or across the Forest (Table 3.5-38). Motorized traffic on open roads would continue to reduce the effectiveness of elk habitat in the same areas that is currently does. Maintaining the current EHE levels would not result in any additional quantifiable effects to elk populations.

Elk Habitat Effectiveness Index

Alternative 2 would not change the existing status of roads or motorized trails on the Forest, so there would be no change in the existing EHE index percentages at any scale (Table 3.5-39). Motorized traffic on open routes would continue to reduce the effectiveness of elk habitat in the same areas that is currently does. Maintaining the current EHE index levels would not result in any quantifiable changes in the existing effects of motorized use on open routes to elk populations.

Elk Security Area (Rifle Season)

Alternative 2 would not change the existing status of roads or motorized trails on the Forest during the rifle season, so there would be no change in the existing amounts of elk security area at any scale (Table 3.5-41). Existing elk security area percentages are generally well below recommended levels to ensure adequate bull carryover (Hillis et al. 1991) when using hunting district's boundaries on the Bitterroot National Forest as surrogates for elk herd units. This indicates that the existing level of elk vulnerability to harvest during the rifle season may be too high in many areas of the Forest to sustain desirable elk herd structure.

Elk Security Area Index (Archery Season)

Alternative 2 would not change the existing status of roads or motorized trails on the Forest during the archery season, so there would be no change in the amount of elk security area at any scale (Table 3.5-42). Current levels of hunting pressure on elk summer ranges during the archery season would continue to encourage elk to migrate to winter ranges on private refuges prior to the rifle season. These early movements to refuges on private winter range are likely to become more prevalent as elk find that they can reduce the risk of mortality from hunting pressure through such movements (Burcham 1999). As a result, elk may become less available to hunters on public lands during the rifle season.

Wildlife Core Security Areas

Alternative 2 would not change the existing status of roads or motorized trails on the Forest during the summer, so there would be no change in the existing core security area at any scale (Table 3.5-44). Current levels of disturbance to elk would continue to force elk to spend time and energy moving away from disturbance, which can reduce the health and vigor of elk herds. However, disturbance during the summer in the absence of hunting pressure is not likely to cause elk to abandon summer ranges for winter ranges.

Percentage of Elk Winter Range Open to Over-snow Vehicle Use

Alternative 2 would not change the existing restrictions on motorized use in some elk winter ranges. Approximately 75 percent (194,549 acres) of elk winter range on the Forest would remain open to over-snow vehicle use (Table 3.5-45). The existing winter area closures in Upper Birch Creek and Canyon Creek would remain intact {Project File document WILD-160.pdf}. Disturbance to elk on winter ranges across the Forest would continue at roughly the existing levels, which would impact elk to some extent.

Alternative 3

Elk Habitat Effectiveness

Changes in the closure status of some roads in **Alternative 3** would reduce the number of third- order drainages that comply with the Forest Plan EHE standard by one (Table 3.5-37). On a broader scale, changes in the closure status of some roads would decrease the EHE in HD 261 by about 5 percent, but would not change the existing EHE in any other hunting district or across the Forest (Table 3.5-38). These minor changes in EHE would be somewhat negative for elk, but would be unlikely to result in any quantifiable effects to elk populations.

Elk Habitat Effectiveness Index

Changes in the closure status of some roads and trails included in **Alternative 3** would result in minor decreases in the EHE index in HDs 204 and 261. The EHE index would remain the same in the other three HDs and across the Forest as a whole (See Table 3.5-39). These changes in the EHE index would be slightly negative for elk, but are unlikely to result in any quantifiable change in elk numbers or herd structure because they are minor, and are spread across the Forest.

Elk Security Area (Rifle Season)

Road and motorized trail closures that are included in **Alternative 3** would increase the amount of elk security area during the rifle season in three hunting districts, but would decrease security area in one hunting district (Table 3.5-41). Elk security area would almost double in HD 261, but would only increase by a minor amount in HDs 250 and

270. Elk security area would stay the same in HD 204. Elk security area in HD 240 would decrease by a small amount due to opening some of the trails in the canyon bottoms to motorized use. The amount of elk security area across the Forest would increase by about 12 percent. Taken together, these minor increases and decreases in security area in many parts of the Forest may reduce elk vulnerability to harvest slightly during the rifle season. Effects to bull carryover and the total size of the elk herds would be unquantifiable, but would likely be minor.

Elk Security Area Index (Archery Season)

Changes in road and motorized trail closures that are included in **Alternative 3** would increase the amount of elk security area during the archery season in two hunting districts, but would decrease the elk security area in three hunting districts (Table 3.5-42). Elk security area would almost double in HD 261, and increase slightly in HD 270. Security area would be eliminated in HD 204, and would decline by a small amount in HDs 240 and 250. The amount of elk security area across the Forest during the archery season would increase by about 4 percent. Taken together, these minor increases and decreases in security area in many parts of the Forest may decrease elk vulnerability to harvest slightly during the archery season. Minor changes in security area in some areas of the Forest during the archery season would likely not alter the tendency of some elk herds to begin moving out of summer ranges during the archery season to seek refuge from hunting pressure on private winter ranges. Elk that leave summer ranges during the archery season due to increased hunting pressure would be less likely to be available to hunters on the Forest during the beginning of the rifle season.

Wildlife Core Security Areas

Elimination of some existing road and motorized trail closures as proposed in **Alternative 3** would reduce the wildlife core security area during the summer in all five hunting districts and across the Forest as a whole (Table 3.5-44). The core security area would decline by about 38 percent in HD 204, and would decline by between 4 and 8 percent in each of the other HDs. The core security area across the entire Forest would decrease by about 4.5 percent. Minor decreases in core security area spread throughout the Forest during the summer could impact the health and vigor of some elk herds to a small degree by increasing the amount of time and energy expended moving away from disturbance. However, modest increases in the amount of disturbance during the summer in the absence of hunting pressure is not likely to cause elk to abandon summer ranges for winter ranges.

Percentage of Elk Winter Range Open to Over-snow Vehicle Use

Eliminating some small existing motorized area closures in elk winter range {Project File document WILD-162.pdf} would increase the percentage of elk winter range on the Forest open to over-snow vehicle use to about 75.6 percent (196,110 acres). Motorized use would be allowed in about 1,561 acres of the 64,770 acres of elk winter range that are currently closed to such use (Table 3.5-45) under **Alternative 3**. The potential for over-snow vehicle use in these areas is limited because of the terrain and the relative lack of snow, although adequate snow undoubtedly exists in these areas at times to allow such use on the roads. These newly opened areas could result in a small increase in motorized disturbance to wintering elk, but it would be difficult to quantify any changes to herd numbers or health as a result.

Alternative 4

Elk Habitat Effectiveness

Road closures included in **Alternative 4** would bring 21 additional third-order drainages into compliance with the Forest Plan EHE standard (Table 3.5-37). On a broader scale, these road closures would increase the EHE in HDs 250 and 261 by about 23 percent and 33 percent, respectively. The EHE in HDs 204 and 270 would increase between 5 and 10 percent, while the EHE in HD 240 would not change. The EHE across the entire Forest would also increase by about 15 percent (Table 3.5-38). These widespread improvements in EHE would be positive for elk, but it would be difficult to quantify actual impacts to elk populations because there are so many other factors that influence elk numbers.

Elk Habitat Effectiveness Index

Road and motorized trail closures included in **Alternative 4** would result in 126 additional third-order drainages meeting the hypothetical EHE index guideline. On a broader scale, these closures would improve the EHE index substantially in HDs 204, 250, and 261 and across the Forest as a whole (Table 3.5-39). The EHE Index in HDs 240 and 270 would increase between 5 and 10 percent. Widespread improvements in the EHE Index may result in some unquantified increase in elk numbers or improve herd structure in some areas because more habitat would be available for elk use.

Elk Security Area (Rifle Season)

Road and motorized trail closures that are included in **Alternative 4** would increase the amount of elk security area during the rifle season in all five hunting districts and across the Forest as a whole (Table 3.5-41). Elk security area would more than quadruple in HD 204, almost triple in HD 261, and almost double in HDs 250 and 270. Security area in HD 240 would only increase by a small amount, because most of this hunting district is in wilderness, and there are few opportunities to increase security area by closing roads or trails. The amount of security area across the Forest would increase by about 60 percent. Large increases in security area in many parts of the Forest may reduce elk vulnerability to harvest during the rifle season, which in turn could potentially increase bull carryover and the total size of the elk herds.

Elk Security Area Index (Archery Season)

Road and motorized trail closures that are included in **Alternative 4** would increase the amount of elk security area during the archery season in all five hunting districts and across the Forest as a whole (Table 3.5-42). Elk security area would increase over ten-fold in HD 204, more than triple in HD 261, and more than double in HDs 250 and 270. Security area in HD 240 would only increase by a small amount, because most of this hunting district is in the Selway-Bitterroot Wilderness or adjacent recommended wilderness or other areas without roads, and there are few opportunities to increase the security area index by closing roads or trails. Elk security area across the entire Forest would increase by over 90 percent. Large increases in security area in many areas of the Forest during the archery season may reduce the tendency of some elk herds to begin moving out of summer ranges during the archery season to seek refuge from hunting pressure on private winter ranges. Elk that remain on summer ranges through the archery season due to reduced hunting pressure would more likely be available to hunters on the Forest during the beginning of the rifle season.

Wildlife Core Security Areas

Road and motorized trail closures during the summer that are included in **Alternative 4** would increase the wildlife core security area in all five hunting districts and across the Forest as a whole (Table 3.5-44). The core security area would quadruple in HD 204, triple in HD 261, and approximately double in HDs 250 and 270. Core security area in HD 240 would only increase by a small amount, because most of this hunting district is in the Selway-Bitterroot Wilderness or adjacent recommended wilderness or other areas without roads, and there are few opportunities to increase the core security area by closing roads or trails. The core security area across the entire Forest would increase by about 52 percent. Large increases in core security area in many areas of the Forest during the summer may improve the health and vigor of some elk herds by reducing the amount of time and energy expended moving away from disturbance. However, disturbance during the summer in the absence of hunting pressure is not likely to cause elk to abandon summer ranges for winter ranges.

Percentage of Elk Winter Range Open to Over-snow Vehicle Use

Alternative 4 would prohibit over-snow vehicle use in the Teepee Creek winter range during the winter to reduce disturbance to elk that winter in this area. This closure, plus additional over-snow vehicle area closures in some recommended wilderness, WSAs, and some IRAs {Project File document WILD-163.pdf}, would reduce the percentage of elk winter range on the Forest open to over-snow vehicles to about 62.9 percent (163,179 acres). Over-snow vehicle use would be prohibited in about 16.1 percent (31,370 acres) of the elk winter range currently open to such use (Table 3.5-45; {Project File document WILD-071.pdf} for this alternative. Many of the areas included in this total are steep, heavily timbered, and rocky, and probably receive little over-snow vehicle use at present. These additional closures would reduce motorized disturbance to wintering elk to some extent, but it would be difficult to quantify any changes to herd numbers or health as a result.

Summary of Direct and Indirect Effects to Elk

Alternative 1 would reduce the risk of human-caused disturbance and hunting mortality to elk somewhat compared to **Alternative 2**, but less than **Alternative 4**. **Alternative 3** would increase the risk of human-caused disturbance and hunting mortality to elk slightly from **Alternative 2**. **Alternative 4** would reduce the risk of human-caused disturbance and hunting mortality to elk somewhat more than **Alternative 1**, but substantially more than either **Alternatives 2 or 3**.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for elk is the Bitterroot River drainage and adjacent areas in other drainages that are used by elk herds that winter in the Bitterroot. This analysis area is appropriate to analyze any incremental effects from the actions of this project on elk in combination with past, present, and reasonably foreseeable activities because it includes the area of numerous elk herd units contained wholly or partially within the Forest. Effects of implementing travel planning decisions on the Bitterroot National Forest would be negligible to elk herds in more distant areas. An assessment of information available at the state scale is also considered to provide additional context.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for elk, which is described in the Affected Environment section, above.

The impacts of travel management actions proposed in this FEIS are analyzed in the Direct and Indirect Effects section. Appendix A to the FEIS describes past, present and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to elk. The amount of elk security area, elk hunting regulations, forage production, and predator numbers all affect elk numbers in the Bitterroot drainage, but it is unknown how these factors interact to influence the trend in elk populations. In addition, increased motorized access to formerly remote elk summer range, combined with an increase in the amount of private winter ranges that are closed to hunting, has resulted in a dramatic shift in elk distribution to private lands in the Bitterroot and other areas.

Many forest activities have little effect on elk populations, because:

- The activity does not occur in elk habitat
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to elk populations include:

- Personal use firewood cutting
- Personal use Christmas tree harvesting
- Special Uses/Permits (excluding Outfitter and Guide Activity)

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Fire Suppression

Elk cover generally increased and elk forage decreased since the early 1900s on the Bitterroot National Forest and surrounding areas. Fire suppression allowed a widespread increase in distribution and density of conifers, including the proliferation of Douglas-fir on sites that were formerly maintained in ponderosa pine by frequent, low-intensity fires. Fire suppression also allowed more mature and old growth forests to develop at mid-to-upper elevations than was usual under historic fire regimes (Gallant et al. 2003). However, these denser forest conditions also increased the risk of the large, high-intensity fires that have become common across the western United States since the late 1980s. These severe fires often eliminate elk cover in burned areas for a number of years. In some cases, high-severity fire can also delay the recovery of grass and forb layers, which reduces the amount of elk forage available in recently burned forests.

Fire suppression activities in themselves have a negligible effect on elk populations. Future large fires on the Bitterroot National Forest and surrounding areas are inevitable, but the location, size and intensity of future fires are unknown.

Timber Harvest, Prescribed Burning, and Associated Activities

Appendix A to the FEIS lists several reasonably foreseeable projects that will include timber harvest. Ongoing and proposed timber harvest projects, including the Three Saddle Vegetation Management Project and the Como Forest Health Protection project, and ecoburning projects such as the Cameron Blue Ecoburn generally reduce the amount of thermal and hiding cover within units in the short term, while increasing the amount of forage production. Many treatment units regenerate into dense hiding cover over time, and may eventually provide thermal cover. Timber harvest and ecoburning can reduce the loss of adjacent forest cover to fire or insect outbreaks, and may thus retain more structural diversity across the landscape. Many timber harvest projects also include road closures intended to move towards meeting the Forest Plan EHE standard. These can reduce the risk of human-caused disturbance and mortality to elk in affected third-order drainages. Timber harvest activities generally create minor, temporary disturbance effects to elk during implementation.

Appendix A to the FEIS lists a number of ongoing and reasonably foreseeable prescribed burning projects, including the Tepee Face, West Tolan and Cameron Blue Ecoburns, and the Upper Nez Perce Landscape Burn. The Bitterroot National Forest has conducted prescribed fires in many elk winter and summer ranges in recent years. Most of these burns have occurred in the spring. Prescribed burning counteracts many of the effects of fire suppression by reducing conifer encroachment into meadows and other open areas, and by reducing the understory conifer layer in forested stands. Prescribed fire generally reduces elk cover and increases elk forage in burned areas, at least in the short term. Reducing elk cover may increase elk mortality rates due to hunting and poaching by increasing sight distances from roads, and by reducing the amount of elk security area.

Invasive Plant Management

The low elevation, grassy slopes preferred by elk for winter or year-long range are also susceptible to invasions of invasive plants that reduce the productivity of native grasses and forbs. Productivity of native grasses and forbs has been improved on some elk winter ranges by herbicide applications intended to reduce invasive plant infestations. It is likely that improved forage productivity on elk winter ranges has increased overall herd health and calf survival to some extent.

Road and Trail Management

The Forest’s road system, which was constructed largely to facilitate timber harvest, increased access to many formerly remote elk summer ranges, especially in the southern and eastern parts of the Forest. Motorized use of these roads disturbed elk outside of the hunting season, making roaded areas less effective as elk habitat. Perhaps more importantly, motorized access to formerly remote areas made elk much more vulnerable to mortality from hunting and poaching, and led to reduced elk numbers in many areas of the western U.S. (Toweill and Thomas 2002), including the Bitterroot drainage.

Approximately 3,300 miles of roads have been identified as part of the Forest’s Transportation System at one time or another. These included roads on private lands within the Forest’s boundary, planned roads that were never constructed, substandard roads that were never constructed to the standard of a specified road, and roads constructed for forest management. About 134 miles of National Forest System roads have been decommissioned, recontoured, and removed from the Forest’s Transportation System. Additionally, about 195 miles have been hydrologically stabilized and placed into long-term storage. While the stored roads are no longer available for motorized public use, they remain on the Forest’s Transportation System, and would be available in the future for administrative use by Forest Service personnel.

About 448 miles of system roads are closed to all motorized use year-round. About 595 miles of system roads are closed to full-sized vehicles year-round, but allow access by OHVs and/or motorcycles on either a seasonal or year-round basis. About 887 miles of system roads remain open year-round to use by highway-legal motorized vehicles, and about 569 miles of system roads remain open seasonally to use by highway-legal motorized vehicles. More than half of the roads that were once part of the Forest’s transportation system are no longer open to full-sized vehicles {Project File document WILD-164.pdf}. Many of these road closures were implemented in the 1970s and 1980s in cooperation with FWP to increase elk security during the hunting season. Road closures in the 1990s and 2000s were largely intended to move towards meeting the EHE standard in the Forest Plan. Elk populations increased throughout this time period, at least partially due to increased security area during hunting seasons created by road closures. Large increases in the amount of elk forage available for several years following the wildfires of 2000 may have also contributed to increases in elk numbers in the early 2000s.

Ongoing and reasonably foreseeable vegetation management projects such as Trapper Bunkhouse and Lower West Fork often include road closures intended to make progress towards meeting the Forest's EHE standards, and/or reduce sediment and erosion problems. Additional road closures would benefit elk by increasing EHE and elk security.

Cattle Grazing

Cattle grazing is allowed on portions of the Bitterroot National Forest as described in Appendix A. Most allotments are at higher elevations and are intended for summer use, but many include areas classified as elk winter range. Forest Plan standards limit cattle forage use to 35% of forage production in elk winter range, and 50% of forage production in elk summer range, although measured utilization rates are generally lower than that. Recent updates to grazing permits have often reduced the number of permitted Animal Unit Months and/or required alternating years of use and rest of pastures, both of which reduce average cattle utilization rates. While cattle grazing does remove some forage production that would otherwise be available for elk, it is likely that permitted utilization rates have only a minor impact on elk populations.

Outfitter and Guide Special Uses/Permits

The Bitterroot National Forest permits a number of outfitters to guide hunting trips on the Forest. Many outfitted trips allow hunters to hunt elk in remote areas that would otherwise be difficult to reach. Outfitted hunts increase the risk of mortality for elk in remote areas, but elk harvested by outfitted hunters are factored in when FWP sets harvest regulations. Outfitted hunting has a minor effect on elk population numbers.

Public Use

Montana Fish, Wildlife & Parks' elk hunting regulations also affected elk populations throughout this time period. Branch-antlered bull regulations were implemented in most of the Bitterroot drainage by the early 1990s, which improved elk herd structure and age diversity. As elk numbers increased, the number of cow elk permits available for Bitterroot HDs increased as a means to keep herd numbers under control. As herd numbers declined after 2005, FWP reduced and eventually eliminated the number of cow permits, and tightened regulations on bulls to reduce harvest and encourage herd numbers to build. Restrictive regulations are likely to continue until herd structure and numbers meet FWP objectives.

Activities on Private and State Lands

Appendix A lists several ongoing or reasonably foreseeable timber sales on state lands. They are the Slocum Creek Timber Sale, Sweeney Creek Timber Permit, and the County Line Timber Sale. These projects affect elk in ways similar to timber sales on the Bitterroot National Forest. Many state lands are at lower elevations, and thus tend to be within elk winter range. Some state lands allow cattle grazing, which can reduce forage available to elk on winter ranges to some extent.

Many areas on private land along the Forest boundary that are within elk winter range have been roaded and subdivided since the 1960s. Loss of availability of winter range forage in these areas, combined with increased disturbance due to the presence of people, vehicles, and dogs have tended to concentrate wintering elk on larger ranches where forage is relatively plentiful and disturbance from people is reduced.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to elk by reducing road and trail miles open to motorized use in elk summer range, and prohibiting over-snow vehicle use in some elk winter ranges. This would reduce the potential for human disturbance and mortality to elk during the summer and winter. Cumulative effects to elk from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to elk because it would not change existing motorized access. All of the above listed present and reasonably foreseeable actions could have cumulative effects on elk, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel

Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would increase cumulative effects to elk by increasing total route miles open to motorized use in elk summer range, and allowing over-snow vehicle use in some elk winter ranges that are currently closed to such use. This would increase the potential for human disturbance and mortality to elk during the summer and winter. Cumulative effects to elk from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to elk by reducing road and trail miles open to motorized use in elk summer range, and prohibiting over-snow vehicle use in some elk winter ranges. This would reduce the potential for human disturbance and mortality to elk during the summer and winter. Cumulative effects to elk from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to elk by reducing road and trail miles open to motorized use in elk summer range, and prohibiting over-snow vehicle use in some elk winter ranges. This would reduce the potential for human disturbance and mortality to elk during the summer and winter. **Alternative 2** would not change the existing level of cumulative effects to elk because it would not change existing motorized access. **Alternative 3** would increase cumulative effects to elk by increasing total route miles open to motorized use in elk summer range, and allowing over-snow vehicle use in some elk winter ranges that are currently closed to such use. This would increase the potential for human disturbance and mortality to elk during the summer and winter.

Trends and Broader Context

The Montana Natural Heritage Program and FWP classify elk as a G5 S5 species (Montana FWP 2015). This means that at both the global and state scales, elk are considered to be common, widespread, and abundant, and not vulnerable in most of their range.

Elk Populations

Subsistence, market, and hide-hunting decimated elk herds across western North America in the 1800s, and by the mid-1880s elk were gone from eastern Montana, and were heavily impacted in western Montana. By 1910, elk numbers across North America were estimated to be less than 50,000 animals (Montana FWP 2004, amended). Elk numbers throughout the West have recovered dramatically since then, especially in the 1970s through 1990s (Toweill and Thomas 2002).

In Montana, only 8,000 elk were estimated to occur across the state in 1922 (Montana FWP, amended). Through elk transplants, regulation of hunting, and natural increases in distribution, elk began to fill much of their former habitat. Today, all timbered mountainous areas of western and central Montana contain elk, and huntable elk herds exist in isolated mountain ranges and timbered areas of eastern Montana. In 2004, post-hunting season elk numbers in Montana alone were estimated to total 130,000 – 160,000 animals (*Ibid*). Elk numbers throughout North America were estimated at 1.2 million animals by 2000 (Toweill and Thomas 2002).

***Elk trend counts for the entire Bitterroot drainage generally increased from 1,613 in 1967, to a new record high of 8,169 elk in the Bitterroot in spring 2005. Elk trend counts declined each of the next three years, and were down to 5,950 in spring of 2008, but have slowly increased since then and totaled 7,373 in 2014{Project File document WILD-052.pdf}. The reasons for this recent decline are the subject of considerable local debate, but a FWP publication stated that the decline is primarily due to increased antlerless harvests implemented to achieve a planned management reduction in response to elk numbers being well over objectives (Hamlin and Cunningham 2009). Other possible causes include increased wolf predation and poor calf survival due to nutritional stress from poor forage production during recent hot, dry summers {Project File document WILD-026.pdf}. The recent changes in elk numbers does not seem to be directly related to access management, since the miles of routes open to motorized use stayed the same or declined in the years prior to and during the recent decrease and subsequent increase in elk numbers. Poor cow/bull and cow/calf ratios observed in 2009, 2010, and to a lesser degree in 2011 indicate problems in elk herd structure that could affect total herd numbers in the future. Recent improvements in cow/calf and cow/bull numbers seem promising. The 2014 count was approximately 4 percent above FWP's elk population objective for the entire Bitterroot drainage (Montana FWP 2004, amended).

Elk numbers are so high in the Bitterroot drainage and across the range of elk in Montana and the rest of western North America that elk viability seems assured for the foreseeable future. Recent declines in elk numbers in the Bitterroot drainage have caused much local concern, but FWP elk trend counts show that the recent low point in elk populations (2008) was still higher than every year the trend count was completed up until 1999, and an increase of 60 percent over the elk trend count at the time the Forest Plan was signed in 1987 {Project File document WILD-052.pdf}. The trend count has increased in three of the four years since the recent low count in 2008 (*Ibid*).

Conclusion

Alternative 1

Alternative 1 would reduce wheeled motorized access on roads and trails in parts of the Forest, which would reduce the risk of human-caused disturbance and mortality to elk during the spring, summer and fall. In addition, it would prohibit over-snow vehicle access to some areas of elk winter range that are currently open to such use, which would reduce the risk of human-caused disturbance and mortality to elk during the winter. This would reduce the cumulative effects of past actions to elk to some extent. While such reductions in motorized access would be positive for elk, motorized access in elk habitat would still be permitted in many areas of the Forest. Reducing the risk of disturbance or mortality to elk over large areas of elk habitat would enhance the viability of elk populations at local and Forest scales, and could encourage some elk to remain on public lands for longer periods during the year.

Alternative 2 (No Action)

Implementation of **Alternative 2** would not impact elk populations or habitat because it would not change the existing condition for motorized access to elk habitat. Cumulative impacts resulting from previous management actions would continue. Elk populations would continue to be viable across the Forest under the existing condition.

Alternative 3

Alternative 3 would reduce wheeled motorized access on roads slightly, but increase wheeled motorized access to trails in remote areas of the Forest. Overall, this would increase the risk of human- caused disturbance and mortality to elk during the spring, summer and fall. In addition, it would allow over-snow vehicle access to some areas of elk winter range that are currently closed to such use, which would increase the risk of human-caused disturbance and mortality to elk during the winter. This would add to the cumulative effects of past actions to elk to some extent. While such increases in motorized access would be negative for elk, there would still be large portions of the Forest where motorized access in elk habitat would still be prohibited. Increasing the risk of disturbance or mortality to elk over some areas of elk habitat would have a minor negative effect on the viability of elk population at local and Forest scales, and could encourage some elk to remain on private lands for longer periods during the year.

Alternative 4

Alternative 4 would reduce wheeled motorized access on roads and trails in many areas of the Forest, which would reduce the risk of human-caused disturbance and mortality to elk during the spring, summer and fall. In addition, it would prohibit over-snow vehicle access to some areas of elk winter range that are currently open to such use, which would reduce the risk of human-caused disturbance and mortality to elk during the winter. This would reduce the cumulative effects of past actions to elk to some extent. While substantial reductions in motorized access would be positive for elk, motorized access in elk habitat would still be permitted in many areas of the Forest. Reducing the risk of disturbance or mortality to elk over large areas of elk habitat would enhance the viability of elk populations at local and Forest scales, and could encourage some elk to remain on public lands for longer periods during the year.

J. American Marten (*Martes americana*) (Management Indicator Species)

Pine marten (more correctly referred to as American marten) are listed in the Bitterroot Forest Plan (USDA Forest Service 1987a) as a management indicator species for mature and old growth forests.

Effects Analysis Methods

Marten use predominantly cooler, moister, habitat types. Much of marten preferred habitat resembles mature and old growth forest. Dead woody debris is an essential component of this habitat (Strickland and Douglas 1987; Witmer et al.1998). Marten in this area are frequently associated with forested riparian habitats, perhaps because the structural components they require are found most consistently in riparian corridors. Riparian stringers of late successional stage vegetation provide important connectors. Marten use forested riparian areas extensively for foraging and resting, and as travel corridors (Claar et al. 1999, Witmer et al. 1998). However, marten are not limited by deep snowpack as fisher are, and can be found in mesic, mature forest habitat throughout the Bitterroot National Forest.

The marten analysis will evaluate the number of miles of roads and trails in riparian corridors open to motorized vehicles during the summer. Motorized use in these areas may have a higher risk of causing disturbance impacts to marten. In addition, since marten are susceptible to trapping during the furbearer season (December 1 to February 15), and trapper access to many areas is facilitated by over-snow vehicles, the marten analysis will evaluate the acreage and percentage of the Forest open to such use during the winter.

Affected Environment

Marten are medium-sized members of the weasel family, but are smaller than fishers. Marten appear to be relatively common and well-distributed in suitable habitat throughout the Bitterroot National Forest.

Martens are usually associated closely with late-successional stands of mesic conifers, especially those with complex physical structure near the ground (Buskirk and Powell 1994). Drainage bottoms with riparian coniferous forests/mesic forest types appear to be preferred habitat for fisher and marten (Buskirk and Powell 1994, Heinemeyer and Jones 1994, Powell and Zielinski 1994). Most studies have reported that marten prefer forests with continuous cover (Claar et al. 1999, Koehler and Hornocker 1977). Martens may inhabit talus or boulder fields above timberline (Streeter and Braun 1968), but are seldom or never found below the lower elevational limit of trees.

The distribution of martens is not limited by deep snowfall as is apparently the case with the distribution of fishers (Krohn et al 1997; Krohn et al. 1995). Marten are common in forested riparian corridors, but can also be found at mid-to-upper elevations if appropriate forest structure is present. Martens often hunt for small mammals such as voles, mice, and shrews in the subnivean zone (the space that forms between the snowpack and the ground) (Strickland and Douglas 1987).

Human impacts to martens are usually described in terms of trapping mortality or habitat degradation through timber harvest. There is little scientific literature that addresses the impacts of motorized recreation to martens. Zielinski et al. (2008) found that OHV use on two study sites in California did not appear to affect marten occupancy, probability of detection, percentage of nocturnal activity, or sex ratios compared to areas without OHV use. However, they cautioned that, although none of the response variables they measured suggested martens were affected by the level of OHV use that occurred in their study sites, they did not measure direct effects of OHV use on marten behavior. As a result, they did not know how marten would react in the presence of OHVs or their sound, or whether marten exposure to OHVs generated a stress response that could produce deleterious effects on reproduction or survival. Without data on vital rates, they could not be sure that OHVs did not have negative effects on martens (*Ibid*). Claar et al. (1999) concluded that marten are somewhat susceptible to habitat fragmentation and population isolation, and that certain recreational activities, as well as poorly placed roads and trails, may contribute to these impacts. Zielinski et al. (2008) agreed with this assessment, but stated that the level of OHV use on their study sites did not affect occupancy for marten, and therefore did not appear to be contributing to fragmentation. However, they recommended locating OHV routes so they avoid high-quality marten habitat, so as to minimize the possibility that martens encounter OHV disturbance when actively engaged in foraging or social behavior (*Ibid*).

The marten's apparent preference for drainage bottoms containing mature, moist coniferous forests indicates that marten on the Bitterroot National Forest are most likely to occur near forested riparian corridors, although they are not limited to those situations nearly as much as are fishers**.** Therefore, potential disturbance impacts to marten from motorized recreation are most likely to occur in areas where roads or trails are within riparian corridors.

Table 3.5-47 displays the miles of roads and trails across the Bitterroot National Forest that are currently open to motorized use within 300 feet of streams during the summer {Project File document WILD-082.pdf}:

Table 3.5- 47: Miles of Roads and Trails Open to Motorized Use within 300 Feet of Streams

	Miles of Open Roads Within 300 Feet of Streams	Miles of Open Trails Within 300 Feet of Streams
Existing Condition	187	171

Human impacts to marten have largely occurred through trapping or forest management that affects marten habitat. Commercial logging often reduces habitat features such as large trees, snags, logs, and overhead cover that are important components of quality marten habitat. Marten are known to be highly vulnerable to trapping and susceptible to overharvest (Powell 1979). Claar et al. (1999) stated that roads and trails increase vulnerability of wolverine, fisher, and marten to trapping mortality, and that refugia (landscapes such as wilderness or back-country areas that are not subject to trapping) are necessary for the long-term persistence of forest carnivore populations. Trappers tend to use motorized vehicles during the December 1 to February 15 trapping season to access habitat on the Forest likely to contain furbearers. Therefore, the area of the Forest open to over-snow vehicles has some bearing on the risk of trapping mortality to furbearers like marten.

Table 3.5-48 displays the acreages and percentages of the Montana portion of the Forest that are currently open and closed to over-snow vehicles during the fur trapping season {Project File document WILD-071.pdf}:

Table 3.5- 48: Acres and Percent of the BNF Open and Closed to Over-snow Vehicles

	Acres and (%) Open to Over-snow Vehicles	Acres and (%) Closed to Over-snow Vehicles
Existing Condition	748,981 (66.4%)	378,484 (33.6%)

<u>Direct and Indirect Effects</u>

Summer

Table 3.5-49 displays the miles of roads and trails across the Bitterroot National Forest that would be open to motorized use within 300 feet of streams during the summer under each alternative {Project File document WILD-082.pdf}:

Table 3.5- 49: Miles of Roads and Trails Open to Motorized Use within 300 Feet of Streams

	Miles of Open Roads Within 300 Feet of Streams	Miles of Open Trails Within 300 Feet of Streams
Alternative 1	177	91
Alternative 2	187	171
Alternative 3	187	186
Alternative 4	87	4

<u>Effects Common to All Action Alternatives</u>

None of the alternatives would change existing marten habitat conditions in terms of the vegetative components that exist on the landscape because almost all routes already exist on the ground. Several short sections of proposed new motorized trail are included in one or more of the alternatives, and likely cross suitable habitat for marten. The additional miles of proposed motorized trails are included in the totals for the various alternatives. However, the environmental effects of removing the vegetation and disturbing soils to construct these new trail segments would be analyzed in future NEPA documents.

Alternative 1

Alternative 1 would reduce the total miles of roads open to summer motorized use within 300 feet of streams by about 10.1 miles {Project File document WILD-082.pdf}. Drainages where proposed road closures could be especially beneficial to martens include Threemile Creek, Overwhich Creek, and the Burnt Fork {Project File document WILD-083.pdf}.

Alternative 1 would close about 84.8 miles of trails currently open to motorized use along streams, but would also open about 4.8 miles of currently closed trails along streams. There would be a net decrease of about 80 miles of trails within 300 feet of streams open to summer motorized use {Project File document WILD-082.pdf}. Many of the trail miles along streams that would be closed are located in recommended wilderness, the Sapphire WSA and the Stony Mountain IRA, as well as portions of the Allan Mountain IRA. Potentially important marten habitat in these areas includes the riparian corridors along Blue Joint Creek, upper Warm Springs Creek, upper Skalkaho Creek, Moose Creek, Sign Creek, and the Burnt Fork {Project File document WILD-084.pdf}, as well as mature mesic forest stands located in upland portions of many of these drainages.

Alternative 2

This alternative would not reduce the potential for human disturbance to martens during the summer because it would not change existing motorized access in riparian corridors {Project File document WILD-082.pdf} or other marten habitat.

Alternative 3

Alternative 3 would decrease the miles of roads open to summer motorized use within 300 feet of streams by about 0.7 miles {Project File document WILD-082.pdf}. It would close about 9.5 miles of currently open trails within 300 feet of streams, but would open about 24.5 miles of currently closed trails, for a net increase of about 15 miles of trail open to motorized use within 300 feet of streams (*Ibid*). Most of the currently closed trail miles along streams that would be opened to motorized use are located in recommended wilderness, including parcels in Bass, Blodgett, North Lost Horse, Mill, Tin Cup, Boulder, Soda Springs, and Watchtower Creeks {Project File document WILD-086.pdf}. All of these drainages contain potentially important marten habitat within their riparian corridors. Allowing motorized use of these trails could increase the risk of disturbance to marten within them to a small degree.

Alternative 4

Alternative 4 would reduce the total miles of roads open to summer motorized use within 300 feet of streams by about 100 miles {Project File document WILD-082.pdf}. Drainages where proposed road closures could be especially beneficial to martens based on the length of road closed and the location of that road in extensive riparian corridors include Threemile Creek, the Burnt Fork, Willow Creek, Skalkaho Creek, upper Sleeping Child Creek, the Martin/Brush/Moose Creek complex, Meadow Creek, Mine Creek, Woods Creek, Soda Springs Creek, Overwhich Creek, Trapper Creek, and Chaffin Creek {Project File document WILD-087.pdf}.

Alternative 4 would reduce the total miles of trails open to summer motorized use within 300 feet of streams by about 167 miles {Project File document WILD-082.pdf}. Many of the trail miles along streams that would be closed are located in recommended wilderness, the Sapphire and Blue Joint WSAs, and the Stony Mountain, Sleeping Child, and Allan Mountain IRAs. Potentially important marten habitat in these areas includes the riparian corridors along Blue Joint Creek, several tributaries of the upper West Fork, upper Warm Springs Creek, most of Sleeping Child Creek, Divide Creek, and Moose Creek, and the Burnt Fork {Project File document WILD-088.pdf}, as well as mature mesic forest stands located in upland areas in many of these drainages.

Over-snow

Table 3.5-50 displays the acreages and percentages of the Montana portion of the Forest that would be open and closed to over-snow vehicles during the marten trapping season under each alternative {Project File document WILD-071.pdf}.

Table 3.5- 50: Acres and Percent of the BNF (MT portion) Open and Closed to Over-snow Vehicles

	Acres and (%) Open to Over-snow Vehicles	Acres and (%) Closed to Over-snow Vehicles
Alternative 1	564,448 (50.1%)	563,017 (49.9%)
Alternative 2	748,981 (66.4%)	378,484 (33.6%)
Alternative 3	753,660 (66.9%)	373,805 (33.1%)
Alternative 4	360,438 (32.0%)	767,027 (68.0%)

Alternative 1

Alternative 1 would reduce the area open to over-snow vehicle use on the Montana portion of the Forest by about 184,533 acres during the marten trapping season {Project File document WILD-071.pdf}. Most of the areas where over-snow vehicle use would be prohibited are in recommended wilderness, the northern half of the Sapphire WSA, the section of the Blue Joint WSA south of the Castle Rock – Bare Cone Ridge, the northern part of the Stony Mountain IRA, and some sections of the Selway-Bitterroot IRA (See Alternative 1 Winter Map on CD). These areas contain low elevation riparian corridors, as well as large expanses of high elevation forests, much of which provide suitable marten habitat. Over-snow vehicle use would be prohibited in several lower elevation riparian corridors that may provide especially productive marten habitat, including those along Blue Joint Creek, North Lost Horse Creek, a large part of Blodgett Creek, the lower parts of many streams draining the Bitterroot Mountains, and the Burnt Fork. Reducing motorized access to these areas may reduce the risk of trapping mortality for martens.

Overall, **Alternative 1** would reduce the risk of disturbance or trapping mortality to marten in many areas of the Forest that provide suitable marten habitat. It would not affect the physical structure of marten habitat. The net effect from reducing motorized access to local marten habitat and populations is expected to be positive for martens.

Alternative 2

This alternative would continue the existing condition for over-snow vehicle access across the Forest. Currently, such use is allowed on approximately 66.4 percent of the Montana portion of the Forest (748,981 acres) during the marten trapping season {Project File document WILD-071.pdf}. Overall, the risk of disturbance or trapping mortality to marten would remain at existing levels.

Alternative 3

Alternative 3 would increase the area open to over-snow vehicle use on the Montana portion of the Forest by about 4,679 acres during the marten trapping season {Project File document WILD-071.pdf}. Most of the acres where such use would be newly allowed are in two existing elk winter range closures (See Alternative 3 Winter Map on CD). One of these straddles Road #969 in the head of Little Willow and Birch Creeks, and provides limited marten habitat in these stream bottoms. Opening this area to over-snow vehicle use would increase the risk of trapping mortality to marten to a very small degree. The other area encompasses the steep south aspect above Canyon Creek from the Forest boundary west to the Selway-Bitterroot Wilderness boundary. While the harsh, open south aspect above the Canyon Creek Trail does not provide any marten habitat, the trail runs through the riparian corridor along Canyon Creek, and would provide over-snow vehicle access to almost 2 miles of good marten habitat that is currently closed to such use. This new access might increase the risk of marten mortality due to trapping along Canyon Creek both inside and outside the Wilderness.

Overall, **Alternative 3** would increase the risk of disturbance or trapping mortality to martens in some areas of the Forest that provide suitable marten habitat. It would not affect the physical structure of marten habitat. The net effect from increasing motorized access to local marten habitat and populations is expected to be somewhat negative for martens.

Alternative 4

Alternative 4 would reduce the area open to over-snow vehicle use on the Montana portion of the Forest by about 388,543 acres during the marten trapping season {Project File document WILD-071.pd}. Most of the areas where such use would be prohibited are in recommended wilderness, the Sapphire and Blue Joint WSAs, the Stony

Mountain, Sleeping Child and Allan Mountain IRAs, and large portions of the Selway-Bitterroot IRA (See Alternative 4 Winter Map on CD). These areas contain riparian corridors as well as large expanses of mature, mesic upland forests, much of which provides suitable marten habitat. Over-snow vehicle use would be prohibited in numerous riparian corridors that may provide especially productive marten habitat including those along Blue Joint Creek, several tributaries of the upper West Fork, Warm Springs Creek, upper Skalkaho and Moose Creeks, Sleeping Child and Divide Creeks, North Lost Horse Creek, a large part of Blodgett Creek, the lower parts of many streams draining the Bitterroot Mountains, and the Burnt Fork. Reducing access to high quality marten habitat in these creek bottoms may reduce the risk of trapping mortality for martens.

Overall, **Alternative 4** would reduce the risk of disturbance or trapping mortality to martens in many areas of the Forest that provide suitable marten habitat, including most of the large unroaded areas that could potentially provide refugia from trapping thought to be important for the persistence of this species (Claar et al. 1999). It would not affect the physical structure of marten habitat. The net effect from reducing motorized access to local marten habitat and populations is expected to be strongly positive for martens.

Summary of Direct and Indirect Effects to Marten

Alternative 1 would reduce the risk of human-caused disturbance and trapping mortality to martens somewhat more than **Alternatives 2 and 3**, but less than **Alternative 4**. **Alternative 3** would increase the risk of human-caused disturbance and trapping mortality slightly from **Alternative 2**, but more than **Alternative 1** and much more than **Alternative 4**. **Alternative 4** would reduce the risk of human-caused disturbance and trapping mortality to martens somewhat more than **Alternative 1**, but substantially more than either **Alternatives 2 or 3**.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for marten is the Bitterroot National Forest and adjacent forested areas that provide potential marten habitat on the Lolo, Beaverhead-Deerlodge, Salmon-Challis, and Clearwater-Nez Perce National Forests. This analysis area is appropriate to analyze any incremental effects from the actions of this project on this species, in combination with past, present (ongoing), and reasonably foreseeable activities because implementing travel management decisions on the Bitterroot National Forest would have negligible effects to martens in more distant areas. Martens in the Bitterroot National Forest portion of the Bitterroot Mountains are likely part of a larger population that also inhabits the Idaho side of the range, but most marten habitat on both sides is within the Selway-Bitterroot Wilderness, the Frank Church River of No Return Wilderness, or in adjacent areas of recommended wilderness or roadless areas where motorized use is prohibited or limited.. Evidence of martens in the Bitterroot National Forest portion of the Sapphires is more limited, but larger, relatively unroaded drainages where martens have been documented to occur on the Bitterroot side of the Sapphires are generally adjacent to unroaded areas on the other side of the Sapphires. An assessment of information available at the state scale is also considered to provide additional context.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for marten, which is described in the Affected Environment section, above.

The impacts of travel management changes proposed in this FEIS are analyzed in the Direct and Indirect Effects section. Appendix A to the FEIS describes past, present, and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to martens.

Many forest activities have little effect on marten populations, because:

- Ø The activity does not occur in marten habitat;
- Ø The activity's disturbance is too small to produce an effect;
- Ø Project design features are applied to reduce the activity's effects to negligible levels;
- Ø The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to marten populations include:

- Ø Prescribed Burning
- Ø Invasive Plant Management
- Ø Cattle Grazing
- Ø Personal use Christmas tree harvesting
- Ø Special Uses/Permits (including Outfitter and Guide Activity)
- Ø Activities on Private and State Land

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Fire Suppression

The amount of suitable marten habitat may have increased since the early 1900s on the Bitterroot National Forest and surrounding areas, as fire suppression has allowed a widespread increase in distribution and density of conifers, including the proliferation of Douglas-fir on sites that were formerly maintained in ponderosa pine by frequent, low-intensity fires. Fire suppression has also allowed more mature and old growth forests to develop at mid-to-upper elevations than was usual under historic fire regimes (Gallant et al. 2003). However, these denser forest conditions also increased the risk of the large, high-intensity fires that have become common across the western United States since the late 1980s. These severe fires may eliminate suitable marten habitat in burned areas for many years, and may reduce marten populations across portions of the landscape.

Fire suppression activities in themselves have a negligible effect on marten populations.

Road and Trail Management

The road system, constructed largely to facilitate timber harvest, increased summer and winter human access to marten habitat, which increased the risk of marten mortality due to trapping, poaching, or vehicle impacts to a considerable extent. Many early road systems were constructed in creek bottoms, which tend to contain the best marten habitat. Locating road systems in high quality marten habitat reduced the amount of closed canopy forest in these locations, and also greatly improved trapper access to marten populations. The combination of habitat loss and increased human access to marten habitat likely resulted in reduced marten populations in roaded drainages. Subsequent road closures have reduced access to many upland areas, some of which provide good marten habitat. However, roads in stream bottoms tend to be main roads that typically remain open because they lead to extensive road systems and/or recreational facilities. Therefore, most previous road closures have not reduced disturbance or trapping pressure for marten in prime marten habitat.

Projects that close additional miles of roads, such as the Martin Creek Watershed Restoration Project, Trapper Bunkhouse, Lower West Fork, the Three Saddle Vegetation Management Project, and the Darby Lumber Lands Watershed Improvement and Travel Management Project, would tend to reduce disturbance and mortality risks to marten by limiting vehicle access to marten habitat. These sorts of projects would have a positive effect to marten in both the short and long terms.

Personal Use Firewood Cutting

Firewood cutting is a popular activity on the Bitterroot National Forest, and appears to have increased during the latest economic downturn. Firewood cutting removes snags and logs that martens often use for resting and denning sites, especially if they contain cavities. Harvesting snags and logs also reduces the amount of down logs on the forest floor, which provide favored foraging sites for martens to hunt small mammals. Firewood cutting along roads in creek bottoms or in any area of mature forest may reduce or eliminate these important habitat components for martens, which could in turn reduce the area's carrying capacity for martens. Firewood cutting is prohibited within 150 feet of streams, but many riparian areas along larger creeks are wider than that. Road closures and specific firewood cutting closures along some larger streams have reduced the potential impacts of firewood cutting to martens along creek bottoms like the Burnt Fork and Lost Horse Creek. However, most roads in larger creek bottoms remain open to firewood cutting as long as they are more than 150 feet from the stream.

Public Use

The growing use of over-snow vehicles over the past several decades increased access for trappers to many areas of high-quality marten habitat along streams, as well as mesic, mature forests in the uplands. This increased access likely increased the risk of marten mortality from trappers. Over-snow vehicle access also increased the risk of disturbing martens during the denning season, which may have impacted marten productivity. Motorized access was prohibited in Designated Wilderness by the Wilderness Act in 1964. Motorized access to portions of the Bitterroot National Forest was further restricted in a number of elk winter ranges by area closures established prior to implementation of the Forest Plan in 1987, and some of these closures also benefited martens by reducing the risk of disturbance in marten habitat. Over-snow vehicle use outside of these restricted areas has become more common as the number of users has increased and the capability of the machines has improved. Increased amount and distribution of over-snow vehicle use has increased the risk of impacts to martens, both in lower-to-mid elevation riparian habitats, and in mesic, mature upland forests.

Timber Harvest, Prescribed Burning, and Associated Activities

Past timber management reduced mature canopy cover, downed woody debris, and snags across the landscape, all of which are important to martens. Forestry practices changed in the 1980s to retain downed woody debris and snags in units. Martens may be vulnerable to fragmentation of habitat (Cushman et al. 2011, Hargis et al.1999), so past timber harvest that created hard edges and large openings may have negatively affected marten habitat. However, the natural fire regime would have favored mixed severity and smaller stand-replacing fires that created a mosaic of mature forest for denning sites, with islands of unburned forest within burned areas that may have increased populations of voles or other prey. This was the pattern observed in the Selway Bitterroot Wilderness as a remnant of the 1910 fires (Koehler and Hornocker 1977).

Appendix A lists several reasonably foreseeable projects that will include some timber harvest. Timber harvest and/or prescribed burning in ongoing or upcoming timber sales and ecoburns such as the Three Saddle Vegetation Management Project, Como Forest Health Protection project, and the Cameron Blue Ecoburn may impact existing marten habitat to some extent by reducing the canopy closure and understory complexity within treatment units, although riparian buffers would protect most of the high quality marten habitat along streams. However, the long-term benefits of reducing fire risk, limiting tree mortality to insect outbreaks, and accelerating growth of remaining trees may produce higher quality marten habitat in treatment units in the future. Many harvest proposals also include some road closures, some of which would reduce motorized access to marten habitat and thus the risk of disturbance to marten populations. The net effect of these types of proposals to marten would be neutral to somewhat negative in the short term, but positive in the longer term.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to martens by reducing over-snow and wheeled motorized access to parts of the Forest that are marten habitat. This in turn would reduce the risk of human-caused disturbance or mortality to martens. Cumulative effects to martens from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to martens because it would not change existing motorized access. All of the above listed present and reasonably foreseeable actions could have cumulative effects on martens, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. For the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would increase cumulative effects to martens by increasing over-snow and wheeled motorized access to parts of the Forest that are marten habitat. This in turn would increase the risk of human-caused disturbance or mortality to martens. Cumulative effects to martens from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to martens by reducing over-snow and wheeled motorized access to parts of the Forest that are marten habitat. This in turn would reduce the risk of human-caused disturbance or mortality to martens. Cumulative effects to martens from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to martens by reducing over-snow and wheeled motorized access to parts of the Forest that are marten habitat. This in turn would reduce the risk of human-caused disturbance or mortality to martens. Alternative 2 would not change the existing level of cumulative effects to martens because it would not change existing motorized access. Alternative 3 would increase cumulative effects to martens by increasing over-snow and wheeled motorized access to parts of the Forest that are marten habitat. This in turn would increase the risk of human-caused disturbance or mortality to martens.

Trends & Broader Context

The Montana Natural Heritage Program and FWP classify the American marten as a G5 S4 species (Montana FWP 2015). This means that at the global scale, marten are considered to be common, widespread, and abundant, and not vulnerable in most of their range. At the state scale, marten are considered to be uncommon but not rare, and usually widespread. They are apparently not vulnerable in most of their range, but there is possibly cause for long-term concern. University of Montana mammologist Kerry Foresman classifies marten as common in Montana, and shows that they occur throughout the western and southwestern parts of the state (Foresman 2001).

Marten are known to be highly vulnerable to trapping and susceptible to overharvest (Powell 1979). Montana Fish, Wildlife & Parks' trapping records indicate that between 1996 and 2003, the average number of marten taken by trappers annually was 1,218 across Montana, 225 within FWP Region 2, and 76 within Ravalli County {Project File document WILD-079.pdf}. From 2004 through 2010, the average number of marten taken by trappers annually was 960 across Montana, 362 within FWP Region 2, and 181 within Ravalli County {Project File document WILD-080.pdf}. Harvest numbers appear to be higher in Region 2 and in Ravalli County in recent years, indicating that marten continue to be a relatively common species in the Bitterroot drainage and surrounding areas. Trappers removed a total of 16,464 marten from Montana between 1996 and 2010 (*Ibid*). Montana Fish, Wildlife & Parks' trapping regulations do not currently limit the number of marten that can be harvested during the trapping season {Project File document WILD-081.pd}).

The Forest participated in a Regional pilot study designed to determine fisher presence within 25 square mile grid cells in 2007, 2008, 2009, 2010 and 2012. The survey methodology is based on baited hair snares that are left in suitable fisher habitat for three weeks. Hairs collected from animals that attempt to reach the bait are then sent to the Wildlife Genetics Lab at the Rocky Mountain Research Station facility on the University of Montana campus for identification. Genetic testing of these hairs confirms the presence of both fishers and martens. Surveys performed by Forest personnel in 2012 sampled fisher habitat in Deep Creek (Selway River drainage), several tributaries entering Nez Perce Creek from the north, Mine Creek, Willow Creek and Butterfly Creek. Martens were detected at three sites in the West Fork District, and at one site on the Stevensville District {Project File documents WILD-174 and WILD-175.pdf}. Surveys in 2010 sampled fisher habitat in several tributaries of Nez Perce Creek and in several tributaries entering both sides of the East Fork Bitterroot River near the end of the East Fork Road. One marten was detected along Nez Perce Creek {Project File document WILD-176.pdf}. Surveys performed by Forest personnel in 2007 to 2009 confirmed the presence of martens in riparian corridors along the Burnt Fork, Daly Creek, Skalkaho Creek, Nez Perce Creek, Soda Springs Creek, Mine Creek, Lost Horse Creek, Roaring Lion Creek, and Tin Cup Creek {Project File document FPMON-035}. In a separate research study, Foresman and Pearson (1998) detected martens in the Bass Creek, Big Creek, Sweathouse Creek, and Bear Creek drainages during a study in the winter of 1994-1995. These detections confirm the wide distribution of this species on the Bitterroot National Forest.

The Bitterroot National Forest has been monitoring marten populations by searching established transects for marten tracks during the winter since 1988. Pine marten population densities and trend information is limited to that reported in the current Forest Plan Monitoring Report {Project File document FPMON-036.pdf}. The information is not sufficient to ascertain population densities or trends, but pine marten tracks have been detected on all the established monitoring routes, indicating pine marten are well distributed across the Forest. This distribution of habitat should allow individual martens to interchange between habitat patches (USDA Forest Service 1990).

Conclusion

Alternative 1

Alternative 1 would prohibit motorized wheeled access to high-quality marten habitat along riparian corridors in the Blue Joint Recommended Wilderness, recommended additions to the Selway-Bitterroot Wilderness in the Bitterroot Mountains, and the Stony Mountain IRA in the Sapphire Mountains. In addition, it would prohibit over-snow vehicle access to large portions of the same areas, which would reduce the risk of trapping mortality. This would reduce the cumulative effects of past actions to marten to some extent. While such reductions in motorized access would be positive for marten, motorized access in marten habitat would still be permitted in areas such as the Sapphire and Blue Joint WSAs, and the Allan Mountain IRA. Reducing the risk of disturbance or mortality to martens over large areas of marten habitat would enhance the viability of martens at local and Forest scales.

Alternative 2 (No Action)

Implementation of **Alternative 2** would not impact marten populations or habitat because it would not change the existing condition for motorized access to marten habitat. Cumulative impacts resulting from previous management actions would continue. Marten populations would continue to be viable across the Forest under the existing condition.

Alternative 3

Implementation of **Alternative 3** would increase motorized access to marten habitat by a very small amount from the existing condition both in summer and winter. It may increase the risk of disturbance slightly, and may also increase the risk of trapping mortality to martens slightly in the Canyon Creek drainage. This would add to the cumulative effects of past actions to marten. These changes represent a slightly-increased risk of disturbance or mortality to martens in the vicinity of new motorized routes. Small increases in the risk of disturbance or mortality to martens would have a very minor negative impact on the viability of martens at local and Forest scales, because marten are common and well distributed across the Forest.

Alternative 4

Alternative 4 would prohibit motorized wheeled access to high-quality marten habitat along riparian corridors in the Blue Joint Recommended Wilderness, recommended additions to the Selway-Bitterroot Wilderness in the Bitterroot Mountains, the Blue Joint and Sapphire WSAs, and all IRAs including Stony Mountain, Sleeping Child, and Allan Mountain. In addition, it would prohibit over-snow vehicle access to the same areas, which would reduce the risk of trapping mortality. This would substantially reduce the cumulative effects of past activities to marten. While such reductions in motorized access would be strongly positive for marten, motorized access in marten habitat would still be permitted in many areas. Reducing the risk of disturbance or mortality to martens over large areas of marten habitat would strongly enhance the viability of martens at local and Forest scales.

K. Mountain Goats

Effects Analysis Methods

The mountain goat analysis will evaluate potential disturbance impacts from motorized vehicles to goats on summer and winter ranges.

Affected Environment

Mountain goats are native to most of the mountain ranges of western Montana, including the Bitterroot and Sapphire Mountains (Rideout and Hoffman 1975). They prefer rugged terrain including sheer cliffs, talus slopes, and mountain tops. During the summer, they forage in high mountain meadows and open sub-alpine forests. Montana Fish, Wildlife & Parks has classified about 591,613 acres of mountain goat habitat on the Bitterroot National Forest {Project File document WILD-148.pdf}. In the winter, goats inhabit south or west-facing, wind-scoured cliffs where ledges are blown clear of snow. Montana Fish, Wildlife & Parks has classified about 68,089 acres of mountain goat winter range on the Bitterroot National Forest {Project File document WILD-149.pdf}, most of which is located in the Bitterroot Range {Project File document WILD-154.pd}.

Goats may migrate altitudinally to lower elevation winter ranges, but summer and winter ranges are often in relatively close proximity depending on the severity of the winter (Rideout 1977). Goats may stay on portions of their summer ranges during milder winters (*Ibid*). Downward migrations coincide with the first heavy snowfalls at high elevations (Rideout and Hoffman 1975), and occurred in early to mid-November in a study in the Sapphires (Rideout 1977). Migration to higher elevation summer range in the spring is gradual, and females with kids and yearlings are last to leave wintering areas (Brandborg 1955). In the Sapphires, movement back to summer ranges occurred in late May or June (Rideout 1977). Annual home range size is relatively small, averaging 21.5 sq. km for males and 24 sq. km. for females in the Sapphires (*Ibid*).

Mountain goats are widely distributed and fairly common in the Bitterroot Range, although numbers have apparently declined since the early 1900s (Smith 1976). A 2015 FWP survey by helicopter found roughly one-third of the goat population estimated to be present in the Bitterroots in the mid-1970s (B.Smith , pers. comm.), indicating that numbers continue to decline. Montana Fish, Wildlife & Parks currently allows very limited permit-only hunting for the species in the Bitterroots. Summer ranges are in the high elevation cirque basins and drainage heads near the top of the Bitterroot Range, and are generally within the Selway-Bitterroot Wilderness. Winter ranges are on the south-facing cliffs in the lower several miles of many of the large canyons emptying to the Bitterroot Valley, and most are at least partially outside the Wilderness on Bitterroot National Forest lands or (in a few cases) on private lands. Portions of a few of these winter ranges can be accessed by roads, either at the bottom (e.g., Lost Horse Creek) or at the top (e.g., Sweeney Creek), or by over-snow vehicles along the bottom or top, but most are accessible only via trails closed year round to motorized use.

Unlike most goat ranges, there is no true alpine zone in the Sapphire Mountains (Rideout 1977). Mountain goat range is mostly confined to the higher portions of the Sapphire crest. One goat population uses the area around Palisade, Skalkaho, and Dome Shaped Mountains and Boulder Basin during the summer, and winters mostly on the south face of Palisade Mountain or on south aspects between Boulder Basin and Eagle Point (Rideout 1974, 1977). A largely separate population uses the area between Fox Peak and Chain of Lakes during the summer, and winters on faces between some of the tributaries of Martin Creek {Project File document WILD-020.pdf}. However, during mild winters in the Sapphires, goats stay at high elevations within or near their summer and fall ranges (Rideout 1977)

Mountain goat populations in the Sapphire Range have declined dramatically since the 1970s, and FWP no longer issues any hunting licenses for goats in that area. Rideout (1974) estimated that there were 65-76 mountain goats in the Dome Shaped Mountain herd in the early 1970s. There appear to be very few goats left in either the Dome Shaped Mountain or the Fox Peak-Chain of Lakes herds {Project File document WILD-020.pdf}. Although the reasons for this decline in the absence of hunting pressure are not clear, FWP noted that OHVs and snowmobiles use these areas rather heavily during the summer and winter, respectively, and that populations in the Bitterroot Mountains, where there is some regulated harvest but little motorized use, are doing well {Project File document WILD-020.pdf}. Joslin (1986) suggested that the cumulative effects of stress caused by a historically high amount of human disturbance may have been responsible for reduced kid production, reduced numbers of female goats, and a declining goat population in the Teton-Dupuyer segment of the Rocky Mountain Front goat herd compared to the goat herd in the adjacent Birch-Badger segment. The latter area was relatively inaccessible and was much less influenced by human activities. Intense seismic exploration supported by frequent helicopter use in the early 1980s coincided with reduced kid production in both areas. Kid production returned to earlier high levels following cessation of seismic activities in 1985 in the Birch-Badger herd, but remained low in the more disturbed Teton-Dupuyer herd.

Rideout and Hoffman (1975) cite several authors to suggest that mountain goat populations in Idaho and Montana had been decimated in the years prior to their publication due to disturbance during and following road construction, and resultant easing of human access. Gilbert (2003) noted that mountain goats occupy the highest, coldest, most rugged regions on marginal forage resources of any ungulate in North America. He suggested that excessive stress and energy costs of displacement from preferred habitat by motorized access, in summer and winter, can be expected to be especially detrimental for population viability of mountain goats. St-Louis et al. (2013) documented that ATV use on trails in mountain goat summer range in Alberta caused moderate to strong disturbance reactions by goats 44% of the time, with potential detrimental effects on fitness-related behaviors such as feeding and parental care. They suggested implementing active management strategies, such as establishing regulations on the use of ATVs in the wild (*Ibid*).

Côté et al. (2013) found that mountain goats in Alberta showed only very slight habituation to repeated helicopter use over a period of 10-15 years.

Although goats appear to be disturbed by motorized use, there are few recommendations for buffer zones in the scientific literature. Côté (1996) recommends restricting helicopter flights within 2 km. (about 1.2 miles) of goat habitat. Since wheeled vehicles on roads and trails tend to be less visible and less audible than aircraft, it was assumed that a buffer about ½ the width of the one recommended by Côté (1996) for helicopters would be adequate to protect goats. Since the resulting 1 km. buffer was close to the width of the ½ mile buffer used for elk and other species, the project's wildlife biologist opted to use a ½ mile buffer for goats as well. The ½ mile buffer around roads and trails open to motorized vehicles within or near goat spring, summer, and fall range was subtracted from the total area of goat range to estimate the number of acres and percentage of goat spring, summer, and fall range that would be outside the zone of motorized influence across the Forest. Table 3.5-51 displays the acres and percentage of mountain goat spring, summer, and fall range that are currently outside the zone of motorized influence defined by this ½ mile buffer around open roads and trails {Project File document WILD-148.pdf}.

Table 3.5- 51: Acres and Percent of Mountain Goat Summer Range outside the Zone of Motorized Influence

	Existing Condition
Acres and (%) Goat Summer Range Outside the Zone of Motorized Influence	414,990 (70.1%)

Goats are also susceptible to disturbance on winter ranges, which are much more limited than summer ranges. Table 3.5-52 displays the acres and percentage of goat winter range that are open to over-snow vehicle use across the Forest {Project File document WILD-149.pdf}. The ½ mile buffer was not applied to areas open to over-snow vehicles for this analysis because these machines are not limited to roads and trails.

Table 3.5- 52: Acres and Percent of Mountain Goat Winter Range Open to Over-snow Vehicles

	Existing Condition
Acres and (%) of Goat Winter Range Open to Over-snow Vehicle Use	33,381 (49.0%)

Direct and Indirect Effects

Summer

A ½ mile buffer around roads and trails near or in goat summer range that would be open to motorized use was used to determine the number of acres and percentage of goat spring, summer, and fall habitat that would be outside the zone of motorized influence. This assumption allowed for the comparison of the relative effects of the alternatives to goats, even if the actual buffer width is uncertain. A large percentage of the goat summer range on the Forest is in either the Selway-Bitterroot Wilderness or the Anaconda-Pinter Wilderness, and would thus be outside the zone of motorized influence under all alternatives. Table 3.5-53 displays the acres and percentage of mountain goat spring, summer, and fall range that would be undisturbed by motorized vehicles for each alternative {Project File document WILD-148.pdf}.

Table 3.5- 53: Acres and Percent of Mountain Goat Summer Range outside the Zone of Motorized Influence

	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**
Acres and (%) Goat Summer Range Outside the Zone of Motorized Influence	456,145 (77.1%)	414,990 (70.1%)	396,879 (67.1%)	517,261 (87.4%)

Alternative 1

Alternative 1 would reduce the potential for human disturbance and mortality to mountain goats during the summer by reducing human presence in some of the subalpine habitats preferred by goats for summer range that are outside Designated Wilderness. **Alternative 1** would increase the area of goat summer habitat that is outside the zone of motorized influence by about 41,155 acres. With the exception of the Willow Mountain area, none of the identified goat summer range on the Forest is accessed by roads. This alternative would prohibit motorized use on trails in goat summer range in the Stony Mountain IRA and in portions of the Sapphire WSA {Project File document WILD-151.pdf}, two areas near the Sapphire Crest where human disturbance facilitated by motorized access is suspected of contributing to drastic reductions in goat populations {Project File document WILD-020.pd}. This would benefit goats by reducing potential human disturbance on summer range in these areas. Reducing disturbance would lessen the chance for displacing goats to less suitable habitat, and could improve kid production and survival rates. It would also reduce the potential for poaching losses to the remnant goat populations in these areas. This alternative would not reduce the miles of motorized trail in identified goat summer range in the Allen Mountain IRA or the Blue Joint WSA. This alternative would not affect habitat suitability for goats in terms of the vegetation. The net effect from this combination of factors to local goat populations is expected to be positive.

Alternative 2

This alternative would not reduce the potential for human disturbance and mortality to mountain goats during the summer because it would not change the potential for human disturbance in any of the subalpine habitats preferred by goats for summer range that are outside Designated Wilderness. The existing motorized access to identified goat summer range would continue, as would the risk of displacement of goats to less suitable habitat. It would also continue the existing potential for poaching losses to the remnant goat populations in these areas. This alternative would not affect habitat suitability for goats in terms of the vegetation. **Alternative 2** would likely contribute to a continued downward trend in goat populations in the Sapphires.

Alternative 3

Alternative 3 would increase the potential for human disturbance and mortality to mountain goats during the summer by allowing motorized use on some trails in some of the subalpine habitats preferred by goats for summer range that are outside Designated Wilderness. **Alternative 3** would reduce the area of goat summer habitat that is outside the zone of motorized influence by about 18,111 acres. Most of these areas would be along the Sapphire Crest between Skalkaho Pass and Abundance Saddle, or in some of the recommended wilderness that is currently closed to motorized use, such as the lower half of the Blodgett Creek drainage {Project File document WILD-152.pd}. Increasing disturbance would increase the chance for displacing goats to less suitable habitat, and could reduce kid production and survival rates. It could also increase the potential for poaching losses to the remnant goat population in the Sapphires. This alternative would not reduce habitat suitability for goats in terms of the vegetation. The net effect from this combination of factors to local goat populations is expected to be negative.

Alternative 4

Alternative 4 would reduce the potential for human disturbance and mortality to mountain goats during the summer by reducing human presence in most of the subalpine habitats preferred by goats for summer range that are outside Designated Wilderness. **Alternative 4** would increase the area of goat summer habitat that is outside the zone of motorized influence by about 102,271 acres. With the exception of the Willow Mountain area, none of the identified goat summer range is accessed by roads. This alternative would prohibit motorized use on trails in goat summer range in the Stony Mountain IRA and the Sapphire WSA, two areas near the Sapphire crest where human disturbance facilitated by motorized use is suspected of contributing to drastic reductions in goat populations {Project File document WILD-020.pdf}. It would also eliminate motorized use on trails in goat summer range in the Blue Joint WSA and Allen Mountain IRA {Project File document WILD-153.pdf}. This would benefit goats by reducing potential human disturbance to goats on summer range in these areas. Reducing disturbance would lessen the chance for displacing goats to less suitable habitat, and could improve kid production and survival rates. It would also reduce the potential for poaching losses to the remnant goat populations in these areas. A**lternative 4** would not affect habitat suitability for goats in terms of the vegetation. The net effect from this combination of factors to local goat populations is expected to be strongly positive.

Over-Snow

Table 3.5-54 displays the acres and percentage of goat winter range that are open to over-snow vehicle use across the Forest by alternative {Project File documents WILD-071.pdf and 149.pdf}:

Table 3.5- 54: Acres and Percent of Mountain Goat Winter Range Open to Over-snow Vehicles, by Alternative

	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Acres and (%) of Goat Winter Range Open to Over-snow Vehicle Use	14,500 (21.3%)	33,381(49.0%)	33,839(49.7%)	5,713(8.4%)

Alternative 1

This alternative would reduce the potential for human disturbance to wintering mountain goats to some extent because it would prohibit over-snow vehicle access to approximately 18,881 acres of mountain goat winter range that are currently open to such use. About 21.3 percent (14,500 acres) of identified mountain goat winter range on the Forest would remain open to over-snow vehicle use {Project File documents WILD-071.pdf and WILD-149.pdf}. Several of the areas of identified goat winter range that would be closed in the Sapphires are in the northern part of the Stony Mountain IRA, the adjacent Palisade Mountain area, and two faces along the southern edge of the Sapphire WSA in the Moose and Sign Creek drainages {Project File document WILD-155.pdf}. Closing these areas and the northern half of the Sapphire WSA to over-snow vehicle use could also reduce disturbance to wintering goats using areas not identified as goat winter range during milder winters when they sometimes stay on portions of their summer ranges (Rideout 1977). Existing over-snow vehicle access to other identified goat winter range in the Sapphire WSA and the Allen Mountain IRA would not change. Goat winter range is often much more restricted than goat summer range, and as a consequence goats that are disturbed on winter range may have few options for escape to other suitable habitat.

Most of the high quality goat winter range on the Forest is located on south-facing cliffs in the lower several miles of many of the large canyons bisecting the Bitterroot Range. Large portions of most of these goat winter range areas are in the Selway-Bitterroot Wilderness, and would not be affected by this alternative because no motorized use is currently allowed in those areas. **Alternative 1** would prohibit over-snow vehicle use in recommended wilderness areas, which are currently open to such use. This would protect goats on winter ranges in lower Little West Fork Creek, Soda Springs Creek, Boulder Creek, Trapper Creek, Chaffin Creek, Tin Cup Creek, North Lost Horse Creek, Sawtooth Creek, Blodgett Creek, Mill Creek, Bear Creek, Kootenai Creek, and Bass Creek canyons {Project File document WILD-155.pd}. Over-snow vehicle use in these areas is generally only feasible along trails in the creek bottoms, or sometimes on ridges separating drainages, not on the cliffs that are used as winter range. However, this alternative would eliminate the risk of disturbance to wintering goats from over-snow vehicles either below or above wintering cliffs within recommended wilderness. **Alternative 1** would also prohibit over-snow vehicle use in the vicinity of several goat winter ranges within the Selway-Bitterroot IRA such as Fred Burr Creek and Lost Horse Creek canyons {Project File document WILD-155.pd}. The benefits to goats in these areas would be similar to those in recommended wilderness, since most of the terrain within them is too extreme for over-snow vehicle use.

Alternative 1 would eliminate the existing winter range area closure on the south face of Canyon Creek canyon between the Forest boundary and the Selway-Bitterroot Wilderness boundary, where the slope from Canyon Creek up to Romney Ridge is identified as goat winter range {Project File document WILD-155.pdf}. Part of this goat winter range area is immediately above the last mile of the Canyon Creek Road, which is currently open to motorized use. The rest is above the Canyon Creek Trail. Eliminating this area closure could result in some increase in the potential for over-snow vehicle disturbance to wintering goats since such use would be legal along the bottom of the slope (although the trail itself would still be closed to such use). The rough, steep terrain and relative lack of snow on this slope essentially limits over-snow vehicle access to the main road or to the creek bottom.

Alternative 1 would not affect the suitability of vegetative habitat for goats. It would benefit the Dome Shaped Mountain goat herd by reducing the potential for human disturbance to goats on their winter range (or summer range used during mild winters) in the Stony Mountain IRA and in the Palisade Mountain area. It would benefit the Kent Peak goat herd by reducing the potential for human disturbance to goats on their winter range in the Moose and Sign Creek drainages.

Alternative 2

Alternative 2 would not reduce the potential for human disturbance to mountain goats on winter ranges because it would not change existing over-snow vehicle access to the vicinity of any identified goat winter range. Approximately 49.0 percent (33,381acres) of the area classified as goat winter range across the Forest would remain open to over-snow vehicle use {Project File documents WILD-071.pdf and WILD-149.pdf}. Goat winter range is often much more restricted than goat summer range, and as a consequence goats that are disturbed on winter range may have few options for escape to other suitable habitat.

Most of the high quality goat winter range on the Forest is located on south-facing cliffs in the lower several miles of many of the large canyons bisecting the Bitterroot Range. Most of these goat winter range areas are either in the Selway-Bitterroot Wilderness, recommended wilderness, or in other areas not accessible by motorized roads or trails. **Alternative 2** would not change the existing condition for disturbance to goat winter range in those areas. It would not eliminate the existing winter range area closure in lower Canyon Creek.

Alternative 2 would not affect the suitability of vegetative habitat for goats. It would not benefit goats because it would not reduce the potential for human disturbance to goats on any winter ranges on the Forest.

Alternative 3

Alternative 3 would increase the potential for human disturbance to mountain goats on winter ranges to some extent because it would permit over-snow vehicle access to about 458 acres of goat winter range where such use is currently prohibited. All existing areas open to over-snow vehicles would be retained, but **Alternative 3** would eliminate the existing elk winter range area closure on the south face of Canyon Creek canyon between the Forest boundary and the Selway-Bitterroot Wilderness boundary. This area is also identified as goat winter range. Approximately 49.7 percent (33,839 acres) of the area classified as goat winter range across the Forest would be open to over-snow vehicle use {Project File documents WILD-071.pdf and WILD-149.pdf}.

Most of the high quality goat winter range on the Forest is located on south-facing cliffs in the lower several miles of many of the large canyons bisecting the Bitterroot Range. Large portions of most of these goat winter range areas are in the Selway-Bitterroot Wilderness, and would not be affected by this alternative because no motorized use is currently allowed in those areas. Portions of several goat winter ranges are in areas classified as recommended wilderness, which are currently open to motorized use. Over-snow vehicle use in these areas is generally only feasible along trails in the creek bottoms, or rarely on ridges separating drainages, not on the cliffs that are used as winter range. Since **Alternative 3** would allow over-snow vehicle use to continue in all recommended wilderness, it would maintain the existing risk of disturbance to wintering goats from over-snow vehicles either below or above wintering cliffs in those areas {Project File document WILD-156.pdf}. **Alternative 3** would also allow over-snow vehicle use to continue in sections of the Selway-Bitterroot IRA that contain goat winter habitat, such as Lost Horse Creek and Fred Burr Creek canyons, which would maintain the existing risk of disturbance to goats in these areas (*Ibid*).

Alternative 3 would eliminate the existing elk winter range area closure on the south face of Canyon Creek canyon between the Forest boundary and the Selway-Bitterroot Wilderness boundary, where two small areas are identified as goat winter range. However, as noted under the **Alternative 1** (winter), eliminating this area closure would have limited effect on the potential for motorized disturbance to wintering goats because the Canyon Creek Road is already open, and there is little over-snow vehicle terrain available off the road. Goat winter range is often much more restricted than goat summer range, and as a consequence goats that are disturbed on winter range may have few options for escape to other suitable habitat.

Alternative 3 would not affect the suitability of vegetative habitat for goats. It would not benefit goats because it would not reduce the potential for human disturbance to goats on any winter ranges on the Forest.

Alternative 4

Alternative 4 would greatly reduce the potential for human disturbance to wintering mountain goats because it would prohibit over-snow vehicle access to approximately 27,668 acres of mountain goat winter range that are currently open to such use. About 8.4 percent (5,713 acres) of identified mountain goat winter range on the Forest would remain open to over-snow vehicle use {Project File documents WILD-071.pdf and WILD-149.pdf}. **Alternative 4** would prohibit over-snow vehicle access in all of the identified goat winter range in the Stony Mountain IRA, and the Allan Mountain IRA. It would also prohibit over-snow vehicle access in identified goat winter range in the Palisade Mountain area, and the Moose Creek and Sign Creek areas near the southern edge of the Sapphire WSA {Project File document WILD-157.pdf}. This could also reduce disturbance to wintering goats using areas not identified as goat winter range during milder winters when they sometimes stay on portions of their summer ranges within the Sapphire WSA and Allan Mountain IRA (Rideout 1977). Reducing disturbance within or near the winter ranges of goats in these areas may be critical to maintaining goat populations in the Sapphires. Goat winter range is often much more restricted than goat summer range, and as a consequence goats that are disturbed on winter range may have few options for escape to other suitable habitat.

Alternative 4 would have the same effects to disturbance to goat winter ranges in the recommended additions to the Selway-Bitterroot Wilderness and sections of the Selway-Bitterroot IRA in the Bitterroot Range as those described under **Alternative 1**.

Alternative 4 would not affect the suitability of vegetative habitat for goats. It would benefit the Dome Shaped Mountain and Kent Peak goat herds by reducing the potential for human disturbance to goats on their winter ranges (or summer ranges used during mild winters) in and near the Stony Mountain IRA and Sapphire WSA. It would benefit the goat herd in the Bitterroot Mountains by reducing the potential for human disturbance to goats on their winter ranges located in recommended additions to the Selway-Bitterroot Wilderness, and parcels of the Selway-Bitterroot IRA. It would also benefit the little-known goat herd in the Allan Mountain IRA by reducing the potential for human disturbance to goats on their winter ranges between the West Fork and East Fork of the Bitterroot River.

Summary of Direct and Indirect Effects to Mountain Goats

Alternative 1 would reduce the risk of motorized impacts to mountain goats during the winter and summer more than **Alternatives 2 and 3**, but less than **Alternative 4**. **Alternative 3** would be the only alternative that would increase the risk of motorized impacts to goats during the winter and summer.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for mountain goats is the Bitterroot National Forest, and adjacent forested areas that provide potential goat habitat on the Lolo, Beaverhead-Deerlodge, Salmon-Challis, and Clearwater-Nez Perce National Forests. This analysis area is appropriate to analyze any incremental effects from the actions of this project on these species in conjunction with past, present, and reasonably foreseeable activities because goats that inhabit the high ridges that form the boundaries of the Bitterroot National Forest almost certainly include portions of adjacent national forests within their home ranges. However, the effects of implementing travel management decisions on the Bitterroot National Forest would have negligible effects to goats in more distant areas. An assessment of information available at the state and wider levels is also considered to provide additional context.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for mountain goats, which is described in the Affected Environment section, above.
The impacts of travel management activities proposed in this FEIS are analyzed in the Direct and Indirect Effects section. The net effect of these proposals to goats would be somewhat positive since they would generally reduce the risk of disturbance to goats on summer and/or winter ranges. Appendix A to the FEIS describes past, present and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to goats.

Many forest activities have little effect on mountain goat populations, because:

- The activity does not occur in goat habitat;
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to goat populations include:

- Fire Suppression
- Prescribed Burning

- Invasive Plant Management
- Cattle Grazing
- Personal Use Firewood Cutting
- Personal use Christmas tree harvesting
- Special Uses/Permits (including Outfitter and Guide Activity)
- Activities on Private and State Land

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Road and Trail Management

The Forest's road system, constructed largely to facilitate timber harvest, generally did not access either summer or winter mountain goat habitat, so it had little effect on goat populations. Some exceptions, such as the Skalkaho Highway (#38) and Lost Horse Creek Road #429 did lead directly to summer goat habitat, while others such as Crooked Creek Road #1352, Skalkaho-Rye Road #75, Willow Mountain Road #1302, and Signal Creek Road #1348 provided access close enough that many people could realistically hike to goat habitat. Trails such as the Chain of Lakes (Trail #39), and Trails #182 and #248 leading to Overwhich Falls that became popular with motorized users, also increased human access into goat summer habitat. The increased access to summer goat habitat provided by these roads and trails may have resulted in increased hunting or poaching pressure and disturbance to goats, which in turn may have contributed to the decline of goat populations in the Sapphire Range and perhaps other areas.

Public Use

The growing use of over-snow vehicles over the past several decades increased access to some goat wintering areas. This increased access likely increased the risk of disturbance to goats during the winter when they are most vulnerable to disturbance impacts. Motorized access was prohibited in Designated Wilderness by the Wilderness Act in 1964. Over-snow vehicle use outside of these restricted areas has become more common as the number of users has increased and the capability of the machines has improved. Increased amount and distribution of over-snow vehicle use has increased the risk of impact to goats, and may have contributed to declines in the goat populations in the Sapphire Range seen since 1974.

Montana Fish, Wildlife & Parks allows a very limited amount of mountain goat hunting in the Bitterroot Mountains, but no longer allows goat hunting in the Sapphire Range. Hunting results in a small amount of goat mortality in the Bitterroot Range, but is within FWP's management objectives for the area. The number of permits is unlikely to increase in the immediate future, but could decline if goat numbers decline.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce the cumulative effects to mountain goats by reducing trail miles open to motorized use in goat summer range, and prohibiting over-snow vehicle use in some goat winter ranges. This would reduce the potential for human disturbance and mortality to goats during the summer and winter. Cumulative effects to goats from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to mountain goats because it would not change existing motorized access. All of the above listed present and reasonably foreseeable actions could have cumulative effects on mountain goats, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would increase cumulative effects to mountain goats by increasing trail miles open to motorized use in goat summer range, and allowing over-snow vehicle use in one small area of goat winter range that is currently closed to such use. This would increase the potential for human disturbance and mortality to goats during the summer and winter. Cumulative effects to mountain goats from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce the cumulative effects to mountain goats by reducing trail miles open to motorized use in goat summer range, and prohibiting over-snow vehicle use in some goat winter ranges. This would reduce the potential for human disturbance and mortality to goats during the summer and winter. Cumulative effects to mountain goats from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce the cumulative effects to mountain goats by reducing trail miles open to motorized use in goat summer range, and prohibiting over-snow vehicle use in some goat winter ranges. This would reduce the potential for human disturbance and mortality to goats during the summer and winter. Alternative 2 would not change the existing level of cumulative effects to mountain goats because it would not change existing motorized access. Alternative 3 would increase cumulative effects to mountain goats by increasing trail miles open to motorized use in goat summer range, and allowing over-snow vehicle use in one small area of goat winter range that is currently closed to such use. This would increase the potential for human disturbance and mortality to goats during the summer and winter.

Trends and Broader Context

The Montana Natural Heritage Program ranks the mountain goat as a G5 S4 species (Montana FWP 2015). This means that across its range and within Montana, the species is considered common, widespread, and abundant (although it may be rare in parts of its range). It is not considered vulnerable in most of its range. In Montana, mountain goats are considered to be apparently secure, though they may be quite rare in parts of their range, and/or suspected to be declining.

The native range of the mountain goat extends from western Montana, southern Idaho, and the Columbia River in Washington north along the Rocky Mountains as far as the mountains of southeast Alaska, and includes most of the major ranges of the Coast, Cascade, and Rocky Mountains within these north-south limits (Rideout and Hoffman 1975). Mountain ranges isolated from the main ranges by unsuitable lowland habitat were unoccupied prior to the 1930s, but goats have since been introduced successfully into many of them, including the Olympic Mountains in Washington, the Black Hills in South Dakota, and several ranges in Colorado (*Ibid*). In Montana, mountain goats are native to the ranges that form the Continental Divide as well as ranges to the west of the Divide. They were introduced to a number of the “island” ranges in eastern Montana such as the Crazy and Absaroka Mountains, where populations are thriving (Koeth 2008).

Mountain goat populations appear to be declining in a number of smaller, isolated ranges where there are few options to relocate if habitat conditions worsen or if human disturbance causes displacement (Koeth 2008). Examples in western Montana include the Sapphires, where populations dropped from around 75 in the mid-1970s to around 10 in 2008, the Pintler Range, where the number of observed goats dropped from 66 in 1990 to 40 in 2006, and the Flint Creek Range, where goat numbers declined from 40 in 1990 to 25 in 2007 (Koeth 2008). Other examples of declines have been documented in central Idaho, where estimated populations have dropped from 186 goats in 1988 to 61 in 2002 in the White Cloud Range, and from 278 goats in 1988 to 120 in 2002 in the Boulder Range (Foley 2005). In contrast, populations in some Montana mountain ranges with high goat numbers (Cabinet, Bitterroot, Crazy, and Absaroka Mountains) are at or above their long-term averages (Koeth 2008).

<u>Conclusion</u>

Alternative 1 would reduce the cumulative effects of past activities to some extent by reducing the potential for future human disturbance to goats facilitated by motorized access on some summer and winter ranges in the Sapphire and Bitterroot Mountains. Reducing disturbance to goats would benefit mountain goat populations at the local and Forest scales.

Alternative 2 would allow the existing risk of disturbance to goats on summer and winter ranges in the Sapphire Range to continue, which would continue to threaten the viability of mountain goats in the Sapphire Range but not across the Forest. Goats in the Bitterroot Range inhabit areas that are largely unaffected by motorized access, and populations appear to be doing well with the existing level of motorized access.

Alternative 3 would contribute to cumulative effects to mountain goats by increasing potential over-snow vehicle access to a small area of mountain goat winter range in Canyon Creek. This increase in the potential for disturbance to goats on winter range would reduce the viability of mountain goats in the Bitterroot Range to a very small degree. Alternative 3 would allow the existing risk of disturbance to goats on summer and winter ranges in the Sapphire Range to continue, which would continue to threaten the mountain goat population in the Sapphire Range but not across the Forest.

Alternative 4 would reduce the cumulative effects of past activities by reducing the potential for future human disturbance to goats facilitated by motorized access on most identified summer and winter ranges, including those in the Sapphire and Bitterroot Mountains and the Allan Mountain IRA. Reducing disturbance to goats would benefit mountain goat populations at the local and Forest scales.

L. Migratory Birds

Scope of Analysis and Effects Analysis Methods

Most native bird species are protected under the Migratory Bird Treaty Act (16 USC 703-711), regardless of whether they actually migrate or are year round residents. A January, 2001 Executive Order (13186) requires agencies to ensure that environmental analyses evaluate the effects of federal actions and agency plans on migratory birds, with emphasis on species of concern. Over 100 species of migratory birds and almost 100 additional bird species classified as year round residents inhabit the Bitterroot National Forest (BNF) at some stage in their life cycle {Project File document WILD-048.pdf}. For the purposes of this analysis, the term “migratory birds” will refer to all native bird species covered by the Migratory Bird Treaty Act, whether they are migrants or residents.

Migratory birds are a very diverse group, and include raptors, waterfowl, shore birds, game birds, and songbirds. Species of concern include those birds listed under the Endangered Species Act, Forest Service Sensitive Species, and those identified as species of concern by the Montana Natural Heritage Program and Montana Fish, Wildlife & Parks (Montana FWP 2015). Some migratory bird species of concern (yellow-billed cuckoo, bald eagle, peregrine falcon, black-backed woodpecker, flammulated owl, and pileated woodpecker) are addressed as separate species within this document in Section 3.5.3 (A).

It is difficult to address effects to migratory bird species collectively, since travel management actions can have adverse effects on some species, while being neutral, or benefiting others. However, it would not be practical to attempt to address all migratory bird species separately. Therefore, this analysis addresses effects of travel management actions on migratory bird species and habitat in general.

Roads and trails can affect migratory bird species through two primary mechanisms: habitat alteration and disturbance. Habitat alteration refers to the loss or modification of habitat caused by establishing the road or trail prism, and includes the creation of habitat edges along the road or trail prism that bisect otherwise uniform blocks of habitat. The travel planning decision will not increase the length of road prism, and will only increase the length of trail prism open to motorized use about 4.8 miles across the Forest in some alternatives, and thus will not eliminate additional bird habitat in the short term. The analysis of effects to migratory birds will therefore focus on the effects of human disturbance to birds along roads and trails. The analysis method will utilize the wildlife core security area concept described previously in the elk analysis.

Affected Environment

Migratory birds form an extremely diverse group, and as such, occupy all types of habitat available on the Bitterroot National Forest, including lakes, streams, wetlands, riparian areas, grasslands, shrub lands, deciduous forest, coniferous forest, mixed forest, recently burned forest, alpine tundra, rock outcrops, and sheer cliff walls. Many migratory bird species use habitat within the Forest as breeding grounds, while others breed in more northern climes and winter here. Other species protected under the Migratory Bird Treaty Act are residents that may wander after breeding season searching for foraging opportunities, but stay in the same general area yearlong. Some species are habitat specialists and are relatively restricted to certain cover types such as wetlands, riparian, forest interior, or cliff habitat. Others are habitat generalists and can occupy a wide variety of cover types. Some bird species are extremely sensitive to habitat modifications and human disturbance, particularly in breeding areas, while others are much more tolerant of human intrusions, and might actually benefit from habitat modifications resulting from human activities.

Migratory birds include all avian species that nest in or migrate through the Bitterroot drainage, with the exception of exotic species such as European starlings and house sparrows. More than 200 species of migratory birds use the Bitterroot National Forest for part or all of their life processes {Project File document WILD-048.pdf}. Yellow-billed cuckoo is currently listed as a Threatened species that may occur on the BNF {Project file document WILD-051.pdf}, although evidence for such occurrence is lacking (see discussion in Section 3.5.6 B) Bald eagle, black-backed woodpecker, flammulated owl, and peregrine falcon are listed as Sensitive by the Regional Forester {Project File document WILD-090.pdf}. In addition to these species, FWP includes a number of species that may nest on the Bitterroot National Forest on their Species of Concern List. These include black swift, Brewer's sparrow, brown creeper, Cassin's finch, Clark's nutcracker, golden eagle, gray-crowned rosy-finch, great gray owl, Lewis's woodpecker, northern goshawk, pileated woodpecker, veery, and winter wren (Montana FWP 2015).

The presence of travel facilities on the landscape generally affects bird species through habitat modification and associated impacts discussed above. The presence of humans using existing travel facilities typically affects birds through disturbance mechanisms. Bowles (1995) stated: "Human occupation and activity are clearly and directly correlated with declines in breeding populations of birds." Luckenbach (1979) stated that birds have been found to be the vertebrates most sensitive to OHV influence. Human disturbance associated with travel management can elicit both physiological and behavioral responses from birds, which can affect reproductive success and survival.

Physiological responses can include elevated heart rate and increased energy expenditure due to forced avoidance flights, as well as decreased energy intake and potential malnutrition due to displacement from foraging areas. Disturbance during the breeding season can affect reproductive success, while disturbance outside the breeding season can influence a bird's energy balance, and consequently affect survival rates (Knight and Cole 1995a, 1995b).

The most severe physiological response to human disturbance is mortality. Although some migratory species of waterfowl and upland game birds are legally hunted, most migratory bird species are protected under the Migratory Bird Treaty Act and consequently, direct mortality of birds due to human disturbance factors is generally not a significant factor at the population level. However, bird mortality indirectly related to human disturbance can be an important factor driving population levels. For example, predators may learn to follow human scent to nest sites, and avian predators appear to learn about nest locations by visual cues from humans visiting nest sites (Knight and Cole 1995b).

Behavioral responses to human disturbance can influence reproductive success and survival rates of migratory birds. In areas where human disturbance is common, researchers have detected a curtailment of male singing activity in some bird species. Reduced singing efforts may be an indication of diminished breeding activity (Gutzwiller et al. 1997). Human disturbance can also reduce the rate of food delivery to dependent young at the nest site, with subsequent impacts on nestling survival rates (Andersen et al. 1990). Such disturbance during years of food shortage may result in nest abandonment, or preclude females from breeding (Knight and Cole 1995b).

Many songbird species have been noted to alter their behavior patterns after repeated interactions with humans. Nest defense behavior and aggressive responses to humans not only increase energy costs to parent birds, but also might be used as visual cues by predators and nest parasites to detect nest locations (Knight and Cole 1995b). Disturbance from human activity can cause some bird species to expand their home ranges, requiring greater energy expenditures to accomplish daily routines (Andersen et al. 1990).

When adult birds are flushed from a nest in response to human intrusion, nestlings are exposed to increased thermal and water stress. Prolonged exposure to the elements can result in nestling mortality (Luckenbach 1979). Pets traveling with humans can flush adult birds from nests, and may end up killing the young or the parent birds. Some bird species have shown a stronger fear response to domestic dogs than to native predators (Knight and Cole 1995b). Birds flushed from nesting, resting or foraging sites near roads may be at greater risk of mortality due to collision with a vehicle. Fledgling birds are inexperienced flyers and are therefore more vulnerable to collision with passing vehicles.

Birds may change nest locations in response to human disturbance. Alternate nest sites may be less suitable in terms of security and thermal cover, availability of foraging habitat, and perch sites. (Knight and Cole 1995b). Breeding birds use various vertical positions in the vegetation layers for different functions such as feeding, nesting, and resting. Human intrusions can influence vertical bird distribution in vegetation strata by causing displacement from some layers. Changes in vertical distribution could result in greater energy expenditures, increased interspecific competition, and reduced nesting success. Birds displaced into higher levels of the forest canopy may be susceptible to increased stress from environmental factors such as wind, greater temperature variation, and heightened exposure to avian predators. Changes in vertical location of nests may also require greater energy expenditure for adults to access the nest to feed nestlings (Gutzwiller et al. 1998).

Forman et al. (2003) reported that breeding birds seem to be affected by noise disturbance associated with traffic on roads and trails. Noise disturbance from use on roads and trails likely has greater impact on grass and shrub/steppe-associated species than on forest nesting species, due to the greater potential for sound to travel through more open habitat (Hamann et al. 1999). Variation in bird breeding strategies influences the degree to which human intrusion along roads and trails might affect breeding success (Skagen et al. 1999). For example, forest interior breeding birds are less likely to nest near roads and trails than shrub nesters, and are therefore less vulnerable to disturbance from human travel along access routes. Bird species with a low tolerance for noise disturbance often exhibit a behavioral avoidance of roads and roadside habitat, and are less susceptible to mortality from vehicle collisions, but may suffer from reductions in availability of suitable habitat. On the other hand, species that utilize food sources found along roads (e.g., road kills, garbage, spilled grain) are more susceptible to road mortality (Forman et al. 2003).

Although noise associated with human travel is certainly a disturbance factor that can influence bird behavior, birds are able to adapt and habituate more quickly to mechanical (or motorized) noise than to human presence (Gabrielsen and Smith 1995). Therefore, non-motorized use on and off trails may be a more severe disturbance factor for some birds than motorized travel restricted to designated routes. However, motorized vehicles are capable of disturbing more birds per day because they travel much further in a typical day.

Wildlife Core Security Areas

As discussed in the Analysis Methodology for the Elk section, Rowland et al. (2000) suggest that it may be more biologically meaningful to evaluate road effects to wildlife based on distances from roads and spatial pattern of roads than on traditional road density models. To analyze the general effects of disturbance resulting from use of motorized routes on birds during the breeding season, a ½ mile buffer was applied to either side of each route open to motorized use during the summer. This buffer width was selected to reflect recommendations for disturbance buffers around active nests of some forest raptors such as northern goshawks (Reynolds et al.1992).

The area within this buffer along motorized routes is considered to be the “virtual footprint” of the route, within which motorized use may have some impact to wildlife. The percent of a defined area outside of this virtual footprint is then classified as “core area.” The core area is the area in which wildlife is generally undisturbed by travel routes and the activities that occur on them.

Estimates of Wildlife Core Security Area percentages by Hunting District based on the above assumptions were derived using GIS {Project File document WILD-070.pdf}. Table 3.5-55, below, displays core area acres and percentages by Hunting District and for the Montana portion of the Forest for the existing condition.

Table 3.5- 55: Wildlife Core Security Area Percentage during the Summer, Existing Condition

Hunting District #	Total Acres (on BNF)	Core Security Area Acres	Core Security Area %
204	18,266	1,194	6.5
240	307,936	250,080	81.2
250	425,567	160,252	37.7
261	75,866	19,580	25.8
270	298,245	82,152	27.5
Forest Total (MT Portion)	1,125,879	513,258	45.6

Direct and Indirect Effects

Wildlife Core Security Areas

Table 3.5-56 displays Wildlife Core Security Area acres and percentages by Hunting Districts and at the Forest scale for the alternatives {Project File document WILD-070.pdf}, using the methodology described under the Wildlife Core Security Areas section under the Affected Environment.

Table 3.5- 56: Wildlife Core Security Area Percentage during the Summer by Hunting District (HD) Following Implementation of the Alternatives

HD NUMBER	Alt. 1	Alt. 1	Alt. 2	Alt. 2	Alt. 3	Alt. 3	Alt. 4	Alt. 4
Hunting District Number and Area	**Core Security Area Acres**	**Security Area %**	**Core Security Area Acres**	**Security Area %**	**Core Security Area Acres**	**Security Area %**	**Core Security Area Acres**	**Security Area %%**
204 (18,266 Acres)	3,080	16.9	1,194	6.5	738	4.0	5,086	27.8
240 (307,936 Acres)	254,844	82.8	250,080	81.2	239,301	77.7	260,013	84.4
250 (425,567 Acres)	191,302	45.0	160,252	37.7	154,848	36.4	301,293	70.8
261 (75,866 Acres)	38,303	50.5	19,580	25.8	18,088	23.8	58,890	77.6
270 (298,245 Acres)	107,214	35.9	82,152	27.5	78,857	26.4	158,827	53.3
Entire BNF Outside Wilderness (1,125,879 Acres)	594,743	52.8	513,258	45.6	491,831	43.4	784,109	69.6

Table 3.5-56 shows that there are substantial differences in the Wildlife Core Area percentage between the alternatives on a Hunting District scale and on the Forest scale when considering both roads and trails open to motorized use in the calculations

Alternative 1

Road and motorized trail closures during the summer that are included in **Alternative 1** would increase the wildlife core security area in all five hunting districts and across the Forest as a whole (Table 3.5-55). The core security area would almost triple in HD 204, double in HD 261, and increase by about 19-31 percent in HDs 250 and 270. Core security area in HD 240 would only increase by a small amount, because most of this hunting district is in the Selway-Bitterroot Wilderness or adjacent recommended wilderness or other areas without roads, and there are few opportunities to increase the core security area by closing roads or trails. The core security area across the entire Forest would increase by about 16 percent. Large increases in core security area throughout the Forest during the breeding season would reduce disturbance impacts to bird species nesting close to roads and trails to some extent. This could improve nesting success and productivity for many bird species, but the degree of improvement is difficult to quantify.

Alternative 2

Alternative 2 would not change the existing status of roads or motorized trails on the Forest during the summer, so there would be no change in the existing core security area at any scale (Table 3.5-55). Current levels of disturbance to bird species would continue to reduce nesting success and productivity along roads and trails open to motorized use.

Alternative 3

Elimination of some existing road and motorized trail closures during the summer as proposed in **Alternative 3** would reduce the wildlife core security area in all five hunting districts and across the Forest as a whole (Table 3.5-55). The core security area would decline by about 38 percent in HD 204, and would decline by between 4 and 8 percent in each of the other hunting districts. The core security area across the entire Forest would decrease by about 4.5 percent. Decreases in core security area spread throughout the Forest during the breeding season could increase disturbance impacts to bird species nesting close to roads and trails to some extent. This could reduce nesting success and productivity for many bird species in localized areas, but the degree of impact is difficult to quantify.

Alternative 4

Road and motorized trail closures during the summer that are included in **Alternative 4** would increase the wildlife core security area in all five hunting districts and across the Forest as a whole (Table 3.5-56). The core security area would triple in HD 204, and essentially double in HDs 250, 261, and 270.Core security area in HD 240 would only increase by a small amount, because most of this hunting district is in the Selway-Bitterroot Wilderness or adjacent recommended wilderness or other areas without roads, and there are few opportunities to increase the core security area by closing roads or trails. The core security area across the entire Forest would increase by about 52 percent. Large increases in core security area throughout the Forest during the breeding season would reduce disturbance impacts to bird species nesting close to roads and trails to some extent. This could improve nesting success and productivity for many bird species, but the degree of improvement is difficult to quantify.

Summary

Alternative 1 would reduce the risk of human-caused disturbance and mortality to migratory birds more than **Alternatives 2 and 3**, but less than **Alternative 4**. **Alternative 3** would increase the risk of motorized disturbance and mortality to birds somewhat compared to **Alternative 2**, and substantially compared to **Alternatives 1 and 4**. **Alternative 4** would reduce the risk of human-caused disturbance or mortality to birds more than **Alternatives 2 and 3**, and somewhat more than **Alternative 1**.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for migratory birds is the Bitterroot National Forest. This analysis area is appropriate to analyze any incremental effects from the actions of this project on land birds in conjunction with past, present, and reasonably foreseeable activities because most migratory birds have rather small territories and implementing travel management decisions on the Bitterroot National Forest would have negligible effects to migratory birds in more distant areas. An assessment of information available at the Bitterroot Valley level is also considered to provide additional context.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for migratory birds, which is described in the Affected Environment section, above.

The impacts of travel management actions proposed in this FEIS are analyzed in the Direct and Indirect Effects section. Appendix A to the FEIS describes past, present, and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to migratory birds.

Many forest activities have little effect on migratory birds, because:

- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to migratory bird populations include:

- Invasive Plant Management
- Cattle Grazing
- Personal use Christmas tree harvesting
- Special Uses/Permits (including Outfitter and Guide Activity)

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Fire Suppression

The amount of suitable habitat for bird species associated with closed canopy conifer forests may have increased since the early 1900s on the Bitterroot National Forest and surrounding areas, as fire suppression has allowed a widespread increase in distribution and density of conifers, including the proliferation of Douglas-fir on sites that were formerly maintained in ponderosa pine by frequent, low-intensity fires. Fire suppression also allowed more mature and old growth forests to develop at mid-to-upper elevations than was usual under historic fire regimes (Gallant et al. 2003), which provided more habitat for bird species associated with older forests. At the same time, fire suppression reduced the amount of habitat for bird species associated with grasslands, shrubfields, and open forest structure. Over time, these denser forest conditions also increased the risk of the large, high-intensity fires that have become common across the western United States since the late 1980s. These severe fires may eliminate habitat in burned areas for species associated with older, closed canopy forests for many years, but create habitat for cavity nesters and species associated with open areas.

Fire suppression activities in themselves have a negligible effect on migratory bird populations, especially since fire seasons in the Bitterroot National Forest and surrounding areas typically occur after the nesting season has ended for most species, and birds are no longer closely tied to breeding territories.

Timber Harvest, Prescribed Burning, and Associated Activities

Past timber management reduced mature canopy cover, downed woody debris, and snags across the landscape, all of which are important to many bird species. At the same time, these practices created patches of more open habitat and shrub fields that are important habitat features for other bird species. Forestry practices changed in the 1980s to retain downed woody debris and snags in units. Some bird species may be vulnerable to fragmentation of habitat, so past timber harvest that created hard edges and large openings may have negatively affected some bird populations at local scales while positively affecting other populations.

Timber harvest and/or prescribed burning in ongoing or reasonably foreseeable timber sales and ecoburns such as Trapper Bunkhouse, Lower West Fork and the Cameron Blue Ecoburn may impact existing bird habitat to some extent by reducing the canopy closure and understory complexity within treatment units, although riparian buffers would protect most of the high quality bird habitat along streams. However, the long-term benefits of reducing fire risk, limiting tree mortality to insect outbreaks, and accelerating growth of remaining trees may produce higher quality bird habitat in treatment units in the future. Many harvest proposals also include some road closures, some of which would reduce motorized access to bird habitat and thus the risk of disturbance to bird populations. The net effect of these types of proposals to migratory birds would be neutral to somewhat negative in the short term, but positive in the longer term.

Appendix A to the FEIS lists a number of ongoing and reasonably foreseeable prescribed burning projects. The Bitterroot National Forest has ignited prescribed fires in many low-to-mid elevation bird habitats in recent years. Most of these burns have occurred in the spring, often prior to the nesting season for true neotropical migrants. Prescribed burning counteracts many of the effects of fire suppression by reducing conifer encroachment into meadows and other open areas, and by reducing the understory conifer layer in forested stands. Prescribed fire generally improves habitat conditions for bird species associated with open forest conditions, and reduces habitat quality for species associated with dense understories, at least in the short term. In the longer term, prescribed fire can reduce the risk of high-severity wildfire which can eliminate suitable habitat conditions for bird species associated with denser forests for many years.

Personal Use Firewood Cutting

Firewood cutting is a popular activity on the Bitterroot National Forest, and appears to have increased during the latest economic downturn. Firewood cutting removes snags and logs that are important to many bird species for nesting and foraging sites, especially if they contain cavities. Firewood cutting along roads in creek bottoms or in any area of mature forest may reduce or eliminate these important habitat components for many birds, which could in turn reduce the area's carrying capacity for cavity nesting species. Road closures and specific firewood cutting closures along some larger streams have reduced the potential impacts of firewood cutting to birds along creek bottoms like the Burnt Fork and Lost Horse Creek.

Road and Trail Management

The road system constructed largely to facilitate timber harvest increased summer and winter human access to migratory bird habitat, which increased the risk of bird mortality due to vehicle impacts to some extent. Many early road systems were constructed in creek bottoms, which tend to contain high quality habitat for many bird species. Locating road systems in creek bottoms reduced the amount of closed canopy forest and/or riparian vegetation in these locations, and fragmented linear patches of these habitat types. These impacts also resulted from road construction in upland habitats, which generally support lower bird densities. The combination of habitat loss, fragmentation, and increased human access to bird habitats from road construction likely resulted in some unquantified reduction in bird populations in roaded drainages. Subsequent road closures have reduced access to many upland areas, some of which provide good bird habitat. However, roads in stream bottoms tend to be main roads that typically remain open because they lead to extensive road systems and/or recreational facilities. Therefore, many previous road closures have not reduced disturbance or habitat fragmentation for migratory birds in prime bird habitat along streams.

Projects that close additional miles of roads, such as the Martin Creek Watershed Restoration Project, Trapper Bunkhouse, Lower West Fork, and the Darby Lumber Lands Watershed Improvement and Travel Management Project, would tend to reduce disturbance and mortality risks to migratory birds by limiting vehicle access to bird habitat. These sorts of projects would have a positive effect to migratory birds in both the short and long terms.

Activities on Private and State Lands

Appendix A to the FEIS lists several reasonably foreseeable timber sales on state lands. They are the Slocum Creek Timber Sale, Sweeney Creek Timber Permit, and the County Line Timber Sale. The effects of these timber sales on migratory birds would be similar to those described in the previous section for timber management activities on Bitterroot National Forest lands.

Many areas on private land in the Bitterroot Valley and along the Forest boundary have been roaded and subdivided since the 1960s. This has eliminated a lot of habitat for birds associated with grasslands and open forests. The large increase in the number of domestic cats and dogs in these areas has impacted breeding success and numbers of many bird species, especially those that nest on the ground. Increased vehicle traffic has increased the number of birds killed by collisions with vehicles. However, many landowners have improved bird habitat by planting trees and shrubs for landscaping, and provided food in the form of bird feeders. The species composition of the bird community in these areas has changed, but it would be difficult to quantify changes in numbers of birds.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to migratory birds by reducing the miles of roads and trails open to motorized use in parts of the Forest. This in turn would reduce the risk of human-caused mortality and disturbance to migratory birds. Cumulative effects to migratory birds from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to migratory birds because it would not change existing motorized access. All of the above listed present and reasonably foreseeable actions could have cumulative effects on migratory birds, in combination with the ongoing levels of motorized access that would continue to be allowed under the Travel Management Planning Project. However, for the most part, the effects would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would increase cumulative effects to migratory birds by increasing the total miles of trails open to motorized use in parts of the Forest. This in turn would increase the risk of human-caused mortality and disturbance to migratory birds. Cumulative effects from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to migratory birds by reducing the miles of roads and trails open to motorized use in parts of the Forest. This in turn would reduce the risk of human-caused mortality and disturbance to migratory birds. Cumulative effects from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 and 4 would reduce cumulative effects to migratory birds by reducing the miles of roads and trails open to motorized use in parts of the Forest. This in turn would reduce the risk of human-caused mortality and disturbance to migratory birds. Alternative 2 would not change the existing level of cumulative effects to migratory birds because it would not change existing motorized access. Alternative 3 would increase cumulative effects to migratory birds by increasing the total miles of trails open to motorized use in parts of the Forest. This in turn would increase the risk of human-caused mortality and disturbance to migratory birds.

Trends and Broader Context

Monitoring of migratory birds indicates that past management actions have not affected birds as a group within the Bitterroot drainage. It is highly probable that management actions have caused alterations in habitat that favored some species over other species, but monitoring indicates that migratory bird species viability as a whole has not been affected by vegetation management on the Bitterroot National Forest. It is predicted that effects of current actions and proposed actions will not affect viability for this group of birds.

Viability of some species that nest in grassland habitats is a concern on a national scale due to declining populations. It is likely that these species are declining due to agricultural practices that have dramatically reduced the amount of native grassland habitats available within their breeding ranges. Some declines may also be the result of loss of traditional wintering habitats in Central America. Reducing vehicle traffic on roads in open grasslands on the Forest would benefit these species to a small extent by increasing the chances of successful reproduction on the local scale. It is unlikely that such benefits would have any measureable effect on population trends at the Forest or larger scales.

The Region 1 Forest Land Bird monitoring program objective is to monitor trends in land bird populations. Since the inception of the program in 1994, more than 20 permanently marked point-count transects have been established on the Bitterroot National Forest. Other land bird monitoring efforts include five Breeding Bird Survey routes (following the protocols established for a nation-wide network by the U.S. Fish and Wildlife Service (Sauer et al. 2011)) and two Monitoring Avian Productivity and Survivorship banding stations (following the nation-wide protocols established by the Institute for Bird Populations). The latest Forest Plan Monitoring Report contains details of these monitoring efforts {Project File document FPMON-036.pdf}.

Forest personnel also participate in and monitor the results of citizen land bird monitoring efforts, such as the nation-wide Christmas Bird Counts and the Migratory Bird Count. The objective of the Migratory Bird Count is to provide a nation-wide snapshot of the progress of migration on the second Saturday in May of each year. None of the ongoing monitoring has raised concerns about declines of any species.

Conclusion

Alternative 1

Road and motorized trail closures during the summer that are included in **Alternative 1** would increase the wildlife core security area in all five hunting districts and across the Forest as a whole. Large increases in core security area throughout the Forest during the breeding season would reduce disturbance impacts to bird species nesting close to roads and trails to some extent, and could improve nesting success and productivity for many bird species. This would reduce the cumulative effects of past actions to migratory birds to some extent. While such reductions in motorized access would be positive for migratory birds, motorized access in bird habitat would still be permitted in many areas across the Forest. Reducing the risk of disturbance or mortality to migratory birds over large areas of bird habitat would enhance the productivity of migratory bird populations at local and Forest scales.

Alternative 2 (No Action)

Implementation of **Alternative 2** would not impact migratory bird populations or habitat because it would not change the existing condition for motorized access to bird habitat. Cumulative impacts resulting from previous management actions would continue. Migratory bird populations would continue to persist across the Forest under the existing condition.

Alternative 3

Elimination of some existing road and motorized trail closures during the summer as proposed in Alternative 3 would reduce the wildlife core security area in all five hunting districts and across the Forest as a whole. Decreases in core security area spread throughout the Forest during the breeding season could increase disturbance impacts to bird species nesting close to roads and trails to some extent, and could reduce nesting success and productivity for some bird species in localized areas. While such increases in motorized access would be negative for migratory birds, increasing the risk of disturbance or mortality to migratory birds over fairly small areas of bird habitat would have only minor impacts on the productivity of migratory bird populations at local and Forest scales.

Alternative 4

Road and motorized trail closures during the summer that are included in **Alternative 4** would increase the wildlife core security area in all five hunting districts and across the Forest as a whole. Large increases in core security area throughout the Forest during the breeding season would reduce disturbance impacts to bird species nesting close to roads and trails to some extent, and could improve nesting success and productivity for many bird species. While such reductions in motorized access would be positive for migratory birds, motorized access in bird habitat would still be permitted in many areas across the Forest. Reducing the risk of disturbance or mortality to migratory birds over large areas of bird habitat would enhance the productivity of migratory bird populations at local and Forest scales.

M. Animal Movement, Migration, and Dispersal (Fragmentation and Corridors)

Affected Environment

Harrison and Voller (1998) discussed the broad concepts of connectivity and fragmentation, and summarized the literature on these topics from numerous studies. Much of the science behind these concepts has been developed in the context of fragmentation of once homogeneous deciduous forests in the eastern U.S. or Great Britain by agricultural clearing, and emphasizes the value of corridors to connect habitat fragments through highly modified agricultural or urban settings. Harris (1984) used the temperate rain forests of the Pacific Northwest to illustrate the principles of island biogeography theory and the preservation of biotic diversity. The findings on fragmentation and connectivity from these ecosystems may not be directly applicable to the northern Rocky Mountains, because neither ecosystem was created and maintained by frequent natural disturbance events like the ecosystems in the Intermountain West. Forest fragmentation resulting from frequent natural disturbance was much more prominent historically in the northern Rockies than in the eastern deciduous forest or the vast coniferous forests of the Pacific Northwest.

Wildlife populations need to remain connected to other populations to promote genetic exchange that enables smaller populations to persist over time. Forested habitats on the Forest and Region were naturally fragmented, and native wildlife populations are adapted to moving through these fragmented landscapes. Numerous studies (Gruell 1983, Hessburg and Agee 2003, Gallant et al. 2003) show that forests in the Interior Columbia Basin are less fragmented now than they were historically due to fire suppression. This implies that native wildlife populations that are adapted to historically fragmented forested habitats should have no problem moving through the modern forested landscape to a sufficient degree to keep populations connected. The wildlife species most likely to become isolated from other populations are those specialized to grassland and shrubland habitats, since those habitats have become reduced in size and distribution with the invasion of conifers into formerly open areas (Leiburg 1899, Gruell 1983, Habeck 1994).

Movements by large wide-ranging mammals will be analyzed from a regional perspective, including linkages from the Frank Church-River of No Return, Selway-Bitterroot, and Anaconda-Pintler Wildernesses to the Allan Mountain IRA with emphasis on potential barriers to free movement into and through the Bitterroot National Forest. An analysis of animal movement at the local, regional, and grand scales was completed in the Trail Creek Supplemental Information Report (USDA Forest Service 1991b, 20-30) and much of that analysis is also applicable to this analysis. Animal movement analysis will consider the daily activity patterns of animals and how they interact with their habitat at the local scale. Daily activities depend on contiguous suitable habitat, or at least suitable food, cover and water juxtaposed in a small enough area for daily use.

Migration involves periodic (seasonal) movement of animals between areas of habitat suitable for summer and winter range (Kendeigh 1961). In most cases, this involves relatively short migrations of big game between high elevation summer ranges and winter range below high snow accumulation zones, but Neotropical migratory birds spend more time during winter in Western Mexico or Central America than they do during breeding season in Western Montana. In this analysis the Forest only has control over lands involved in the shorter migrations between summer and winter ranges. The Forest Service has no control over, nor direct effect on habitats well beyond National Forest borders and can only do its best to assure suitable seasonal habitats for sustained productivity of long-range migrants.

Dispersal is a one-way outward movement of individuals from suitable, occupied habitat (Kendeigh 1961). The movements appear random, almost erratic, and most involve young animals and exchange of genes between populations in insular habitats.

Dispersal of individuals between populations of wildlife species is an important component of genetic diversity and adaptability of a species to its habitat. Isolated populations are thought to be particularly susceptible to loss of genetic diversity if no movement among populations can occur. It has been postulated that providing suitable corridors for successful dispersal of at least one individual per generation can help maintain genetic diversity (Morrison et al. 1992). Dispersing individuals often travel through areas of unsuitable habitat in order to reach areas of suitable habitat. A corridor is defined as an area through which species can move from one place to another over time in response to changes in environment or as a natural part of their life history. The Trail Creek analysis (USDA Forest Service 1991b, including extensive internal citations) lists four general characteristics of effective corridors:

- "The wider the corridor, the better. Acceptable widths will vary depending on the habitat structure and quality within the corridor, the nature of surrounding habitat, human activities, and the species expected to use the corridor. Hunter … noted type of movement as an additional factor.
- "The shorter the connection, the better. Thomas … and others recognized that dispersal success decreased with increasing distances between habitat blocks.
- "Ridges and stream courses provide natural travel ways and their dendritic pattern works well to tie various landscape features together.
- "Corridors comprised of suitable habitat for the species in question work best for allowing dispersal."

The concept of corridors suggests there are specific areas that certain species of animals use to move from one area to another. Although there may be preferred routes of travel, the historic fire patterns within the Bitterroot National Forest and elsewhere in the Northern Rockies, suggests species were able to move freely enough to successfully evolve and avoid genetic isolation regardless of the sudden and extensive changes in vegetation from fire.

Roads, and the access they provide humans, potentially have influence on animal movement and vegetation patterns. Impacts from roads throughout the Bitterroot National Forest have been partially mitigated with minimal clearing distances, low use, and travel restrictions. Major linkages between refugia like the Selway-Bitterroot, Frank Church-River of No Return, and Anaconda/Pintler Wildernesses and the Allan Mountain IRA are no more interrupted in the current landscape patterns than they were by the major fire occurrences of the past.

Roads create a linear feature on the landscape that interrupts the forest cover, but provide corridors for movement of some plant and animal species into areas from which they may have been excluded. For instance, the spread of spotted knapweed, a noxious weed, by vehicles along roads is obvious. Roads also increase the edge and may lead to invasion of wildlife species (e.g., brown-headed cowbirds) into the forest.

The landscape pattern of successional stages of vegetation and topographic features strongly influence daily activity patterns of animal populations. All animals need food, cover, and water to survive, and the needs must be met within the daily home range. For small mammals, necessities need to be met in a few square yards; for larger mammals or birds, daily movements may occur over several square miles. Existing vegetation and fire severity maps reveal a highly variable vegetation pattern with a wide diversity of habitats. The analysis also indicates that patch size and connectivity of forested areas have increased since the advent of fire suppression, thereby favoring those species that need continuous forest environments. The same suppression actions have degraded habitat for those species that evolved with forest structure typical under a frequent fire regime.

The 1987 Northern Rocky Mountain Wolf Recovery Plan (USDI Fish and Wildlife Service 1987) delineated the Stateline ridge at the head of the West Fork of the Bitterroot River as a "potential dispersal corridor" between the Yellowstone and Central Idaho recovery areas. Since the Plan was written, wolves have dispersed widely, and do not necessarily follow the defined potential corridors. The Final Gray Wolf Recovery Plan made major changes in recovery zone boundaries, and did not delineate dispersal corridors (USDI Fish and Wildlife Service 1994).

Direct and Indirect Effects

Effects Common to All Alternatives

All of the alternatives would retain existing animal movement, migration, and dispersal opportunities because all roads and almost all trails proposed to be open for motorized use already exist on the ground. **None of the alternatives** would alter landscapes beyond the range of natural variation, so none would substantially interrupt existing animal movement and dispersal patterns. No new permanent roads would be built, but forest roads generally present few barriers to movement or dispersal for any wildlife species. **None of the alternatives** would change the existing condition for U.S. Highway 93, State Highway 43 or high-traffic, paved portions of State Highway 38 (the Skalkaho Highway), State Highway 473/County Route 9600 (West Fork Road) and State Highway 472/County Route 9700 (East Fork Road), which are likely the only roads on the Forest that form potential barriers to movement for some species.

Alternative 1

Alternative 1 would reduce the potential disturbance impacts of motorized use to animal movement and migration by reducing the total miles of routes open to motorized use across the Forest. Reducing motorized use on some existing roads and trails would improve animal movement opportunities to a very small degree. Alternative 1 also proposes locations for several short sections of new motorized ATV trails, but these are unlikely to inhibit animal movements. The environmental effects of constructing these new trail segments would be analyzed in future NEPA documents.

Alternative 2

Alternative 2 would not change the existing potential disturbance impacts of motorized use to animal movement and migration because it would not affect the total miles of routes open to motorized use across the Forest.

Alternative 3

Alternative 3 would increase the total miles of routes open to motorized use across the Forest, which would increase the potential disturbance impacts of motorized use to animal movement and migration. However, since most of these “new” routes are existing single track trails, which generally do not present barriers to animal movements, impacts to actual animal movement opportunities would be very minor. Alternative 3 also proposes locations for several short sections of new motorized ATV trails, but these are unlikely to inhibit animal movements. The environmental effects of constructing these new trail segments would be analyzed in future NEPA documents.

Alternative 4

Alternative 4 would reduce the potential disturbance impacts of motorized use to animal movement and migration by reducing the total miles of routes open to motorized use across the Forest. Reducing motorized use on some existing roads and trails would improve animal movement opportunities to a very small degree. Alternative 4 does not propose locations for any new motorized ATV trails

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for animal movement, dispersal, and migration is the Bitterroot National Forest. This analysis area is appropriate to analyze any incremental effects from the actions of this project on animal movement, migration, and dispersal in combination with past, present, and reasonably foreseeable actions.

Activities within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for animal movement, migration and dispersal, which is described in the Affected Environment section, above.

The impacts of travel management actions proposed in this FEIS are analyzed in the Direct and Indirect Effects section. Appendix A to the FEIS describes past, present, and reasonably foreseeable activities that, when combined with the activities proposed in the Travel Management Planning project, could potentially create cumulative effects to animal movement, migration and dispersal.

Many forest activities have little effect on animal movement, migration and dispersal, because:

- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Examples of activities that, when carried out consistent with existing regulations, produce negligible cumulative effects to animal movement, migration and dispersal include:

- Invasive Plant Management
- Cattle Grazing
- Personal use Christmas tree harvesting
- Personal Use Firewood Cutting
- Public Use
- Special Uses/Permits (including Outfitter and Guide Activity)

Other activities have the potential to create cumulative effects in conjunction with the motorized access being considered in this project.

Fire Suppression

The amount of suitable habitat for wildlife species associated with closed canopy conifer forests has likely increased since the early 1900s on the Bitterroot National Forest and surrounding areas, as fire suppression has allowed a widespread increase in distribution and density of conifers, including the proliferation of Douglas-fir on sites that were formerly maintained in ponderosa pine by frequent, low-intensity fires. Fire suppression also allowed more mature and old growth forests to develop at mid-to-upper elevations than was usual under historic fire regimes (Gallant et al. 2003), which provided more habitat for wildlife species associated with older forests.

This increase in forested area reduced fragmentation across the landscape and provided wider, more continuous corridors for movements of animal species associated with forested habitats At the same time, fire suppression reduced the amount of habitat for wildlife species associated with grasslands, shrubfields, and open forest structure, and increased fragmentation of these habitat types The increase in forested area resulted in smaller, more isolated patches of non-forested habitats, and provided less continuous corridors for movements of animal species associated with these habitats. Over time, these denser forest conditions also increased the risk of the large, high-intensity fires that have become common across the western United States since the late 1980s. These severe fires may eliminate habitat in burned areas for species associated with older, closed canopy forests for many years, but create habitat for cavity nesters and species associated with open areas.

Fire suppression activities in themselves have a negligible effect on animal movement, migration and dispersal, because they are temporary, localized disturbances that animals can generally avoid.

Timber Harvest, Prescribed Burning, and Associated Activities

Timber harvest and associated prescribed burning reduces forest canopy cover, downed woody debris, and snags across affected portions of the landscape, which increases fragmentation for species associated with forested habitats. At the same time, these practices create patches of non-forested habitat or more open forests that are important for species associated with grasslands, shrub fields and open forest structure. Forestry practices changed in the 1980s to retain downed woody debris and snags in units. Timber harvest and associated activities can increase forest fragmentation and reduce the width or extent of forested corridors to some extent in localized areas. At the same time, timber harvest and associated activities can result in larger, less isolated patches of non-forested habitats, and provides more opportunities for movements of animal species associated with these habitats.

Timber harvest and/or prescribed burning in ongoing or reasonably foreseeable timber sales and ecoburns such as the Three Saddle Vegetation Management Project, the Como Forest Health Protection project, and the Cameron Blue Ecoburn will impact forested habitats to some extent by reducing the canopy closure and understory complexity within treatment units, although riparian buffers would protect some denser forested habitats along streams. However, the long-term benefits of reducing fire risk, limiting tree mortality to insect outbreaks, and accelerating growth of remaining trees may produce higher quality conditions for wildlife species associated with forested habitats in treatment units in the future. Many harvest proposals also include some road closures, some of which would reduce motorized access to wildlife habitat and thus the risk of disturbance to wildlife populations. The net effect of these types of proposals to wildlife species varies considerably depending on the habitat needs of individual species.

Appendix A to the FEIS lists a number of ongoing and reasonably foreseeable prescribed burning projects. The Bitterroot National Forest has ignited prescribed fires in many low-to-mid elevation areas in recent years. Most of these burns have occurred in the spring, often near the time that many wildlife species produce young. Prescribed burning counteracts many of the effects of fire suppression by reducing conifer encroachment into meadows and other open areas, and by reducing the understory conifer layer in forested stands. Prescribed fire generally improves habitat conditions for wildlife species associated with open forest conditions, and reduces habitat quality for species associated with dense understories, at least in the short term. In the longer term, prescribed fire can reduce the risk of high-severity wildfire which can eliminate suitable habitat conditions for wildlife species associated with denser forests for many years.

Road and Trail Management

The road system constructed largely to facilitate timber harvest increased summer and winter human access to many areas of the Forest, which increased the risk of disturbance and mortality of wildlife species due to motorized vehicle use on roads. Road construction also fragmented intact forest habitats to some extent. The combination of habitat loss, fragmentation, and increased human access to wildlife habitats from road construction likely resulted in some minor reduction in the ability of some wildlife species to migrate or disperse using intact corridors. However, forest roads typically do not create barriers for most wildlife species like paved, high-volume highways can. Subsequent road closures have reduced motorized use on many forest roads, and allowed vegetation to become established on closed roads. Road closures have reduced the negative cumulative effects of roads to animal movement, migration and dispersal.

Projects that close additional miles of roads, such as the Martin Creek Watershed Restoration Project, Trapper Bunkhouse, Lower West Fork, and the Darby Lumber Lands Watershed Improvement and Travel Management Project, would tend to reduce impacts to animal movement, migration and dispersal by limiting vehicle access to wildlife habitat. These sorts of closures would have a small positive effect to animal movement, migration and dispersal in both the short and long terms.

Activities on Private and State Lands

Appendix A to the FEIS lists several reasonably foreseeable timber sales on state lands. They are the Slocum Creek Timber Sale, Sweeney Creek Timber Permit, and the County Line Timber Sale. The effects of these timber sales on animal movement, migration and dispersal would be similar to those described in the previous section for timber management activities on Bitterroot National Forest lands.

Many areas on private land in the Bitterroot Valley and along the Forest boundary have been roaded and subdivided since the 1960s. This has reduced opportunities for animal movement, migration and dispersal, especially from forested summer ranges to winter ranges in lower elevation grasslands. Business and residential development in riparian corridors has reduced opportunities for animal movement, migration and dispersal along riparian corridors.

The large increase in the number of fences and domestic cats and dogs in developed areas has further impacted the ability of animals to move through these areas. Increased vehicle traffic on roads in the valley bottom and foothills has increased the number of animals killed by collisions with vehicles. Increasing urban and rural development in the Bitterroot valley continues to reduce opportunities for animal movement, migration and dispersal, which in turn limits the opportunities for some wildlife populations to interact with other populations.

Cumulative Effects from the Implementation of the Alternatives

Alternative 1

Alternative 1 would reduce cumulative effects to animal movement, migration, and dispersal to a minor degree by reducing the miles of roads and trails open to motorized use in parts of the Forest. This in turn would reduce the risk of human-caused disturbance that could temporarily deter animals from crossing these routes. Cumulative effects to animal movement, migration, and dispersal from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 2

Alternative 2 would not change the existing level of cumulative effects to animal movement, migration, and dispersal because it would not change existing motorized access. Cumulative effects to animal movement, migration, and dispersal from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 3

Alternative 3 would increase cumulative effects to animal movement, migration, and dispersal to a minor degree by increasing the total miles of trails open to motorized use in parts of the Forest. This in turn would slightly increase the risk of human-caused disturbance that could temporarily deter animals from crossing these routes. Cumulative effects from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-increased level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Alternative 4

Alternative 4 would reduce cumulative effects to animal movement, migration, and dispersal to a minor degree by reducing the miles of roads and trails open to motorized use in parts of the Forest. This in turn would reduce the risk of human-caused disturbance that could temporarily deter animals from crossing these routes. Cumulative effects from the above listed present and reasonably foreseeable actions would likely continue. However, for the most part, cumulative effects at this slightly-reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, would be distributed across the Forest, and are not concentrated in one area.

Cumulative Effects Finding

Alternatives 1 a**n**d 4 would reduce cumulative effects to animal movement, migration, and dispersal to a minor degree by reducing the miles of roads and trails open to motorized use in parts of the Forest. This in turn would reduce the risk of human-caused disturbance that could temporarily deter animals from crossing these routes. Alternative 2 would not change the existing level of cumulative effects to animal movement, migration, and dispersal because it would not change existing motorized access. Alternative 3 would increase cumulative effects to animal movement, migration, and dispersal to a minor degree by increasing the total miles of trails open to motorized use in parts of the Forest. This in turn would slightly increase the risk of human-caused disturbance that could temporarily deter animals from crossing these routes.

Other Actions and Trends

Forest ecosystems throughout the Inland Northwest, including the Rocky Mountains, were created and maintained by frequent disturbance, principally fire and flooding (Hessburg and Agee 2003). These disturbances, and the extensive topographic variation in the region, resulted in naturally patchy forest patterns (Tewksbury et al.1998). Human alteration of natural disturbance regimes (timber harvest and fire suppression) has resulted in forest patterns today that are much more homogeneous and extensive than those prior to Euro-American settlement (Gallant et al. 2003). Hessburg and Agee (2003) report that the most widely distributed change in forest structure across the Interior Columbia Basin was sharply increased area and connectivity of intermediate (not new or old) forest structures, and Gruell (1983) states that the most striking change in forests in Region 1 has been the widespread increase in distribution and density of conifers. Gallant et al. (2003) found in the Greater Yellowstone ecosystem that the primary forest dynamic in the study area is not the fragmentation of conifer forest by logging, but the transition from a fire-driven mosaic of grasslands, shrub land, broadleaf forest, and mixed forest communities to a conifer-dominated landscape. Area of conifer-dominated landscapes increased from 15 percent of their study area in 1856 to 51 percent in 1996, while area dominated by aspen and grasslands declined by 75 percent and 40 percent during this period, respectively. Similar patterns of conifer encroachment into grasslands and shrub lands have been documented by many others (Leiburg 1899, Gruell 1983, Habeck 1994). As a result of these changes, more forest exists today in the northern Rockies than at any time since European settlement (Samson 2006).

Much of the scientific literature that describes the effects of habitat fragmentation to wildlife species is based on studies in areas that originally supported large, homogeneous areas of relatively stable late successional forests, such as the eastern United States, the Pacific Northwest, or the Amazon (Wilcove et al. 1986). The effects of fragmentation to wildlife species documented in these areas probably do not apply to the Inland Northwest, where ecosystems were created and maintained by frequent disturbance events that resulted in a high degree of forest fragmentation.

Disturbance and resulting habitat fragmentation are natural parts of forest ecosystems in this area, and native wildlife species are adapted to dynamic ecosystems. Many organisms have adapted to localized fire regimes and are dependent upon either early or late seral habitats (Hutto 1995). Species breeding in ecosystems where frequent small and large-scale natural disturbances have occurred historically may be more resistant to habitat changes (Schmiegelow et al. 1997), and are less affected by habitat fragmentation (Samson 2006).

Native wildlife species have evolved in a landscape with a high degree of fragmentation, abundant edge, and relatively small patch sizes, the result of natural processes and topography. This situation on the Bitterroot National Forest landscape has not been appreciably altered by any past actions on the landscape except for perhaps high volume road systems, and fire suppression. Highway 93 is the only road that appears to have substantially affected wildlife movements. Effects of fragmentation on wildlife dispersal or movement between various habitat elements (water, forage, winter/summer range, and breeding areas) has not affected the viability of any wildlife species on the Forest as discussed in each of the specific species narratives in this chapter.

3.5.7 Consistency with Forest Plan, Laws, and Regulations

A. Bitterroot National Forest Plan

Consistency with the Bitterroot National Forest Plan (USDA Forest Service 1987a) forest-wide resource and management area standards would be accomplished the following ways:

Forest-wide Management Resource Standards

Elk population status will be used as an indicator of commonly hunted ungulate species and the status of their habitat (USDA Forest Service 1987a, II-20).

How addressed:
Elk trend counts, cow/calf ratios and cow/bull ratios for the last 11 years and for 1987 are displayed and discussed in the FEIS, Chapter 3, Section 3.5.6 (H).

The recommendations in the Coordinating Elk and Timber Management Report will be considered during timber management and transportation planning (USDA Forest Service 1987a, II-21).

How addressed:
This publication (Lyon et al. 1985) was cited in the FEIS, Chapter 3, Section 3.5.6 (H).

Manage roads through the travel plan process to attain or maintain 50 percent or higher elk habitat effectiveness in currently roaded third-order drainages. Drainages where more than 25 percent of roads are in place are considered roaded. Maintain 60 percent or higher elk habitat effectiveness in drainages where less than 25 percent of the roads have been built (USDA Forest Service 1987a, II-21).

How addressed:
Elk habitat effectiveness (EHE) is analyzed, displayed, and discussed for the existing condition and the alternatives in the FEIS Chapter 3.5.6 (H). A project-specific Forest Plan amendment was proposed and analyzed in the FEIS Chapter 3, Section 3.5.7 because none of the alternatives meet the EHE standard in all third-order drainages.

The habitat needs of sensitive species, as listed by the Regional Forester, will be considered in all project planning (USDA Forest Service 1987a, II-21).

How addressed:
Habitat needs of sensitive species thought to be affected by motorized recreation were discussed briefly in the FEIS Chapter 3, Section 3.5.3 (A), and as part of the individual species sections in Section 3.5.6. None of the proposed actions would affect actual vegetative habitat because routes already exist on the ground. Effects analysis generally focuses on disturbance impacts of motorized recreation to wildlife species, which can affect the way that species utilize available habitat.

Management Area (MA) Standards

Management Areas 1, 2, 3a, 3b, 3c, 8a, and 8b

Maintain elk habitat effectiveness through road closures as specified in the Forest-wide Standards in Chapter II (Lyon, 1983). (USDA Forest Service 1987a, III-4, 10, 17, 25, 59, and 61).

How addressed:
Elk habitat effectiveness (EHE) is analyzed, displayed, and discussed for the existing condition and the alternatives in the FEIS Chapter 3, Section 3.5.6 (H). A project-specific Forest Plan amendment was proposed and analyzed in the FEIS Chapter 3, Section 3.5.7 because none of the alternatives meet the EHE standard in all third-order drainages.

Management Area 3a

Close the road through Signal Creek to motorized vehicles during hunting season (USDA Forest Service 1987a, p. III-17).

How addressed:
See the FEIS Appendix I. Road #1348 through Signal Creek is closed to all motorized vehicles during the rifle hunting season in Alternatives 1, 2 and 3; it is closed year-long in Alternative 4.

Analysis of the Elk Habitat Effectiveness Forest Plan Amendment

The Forest proposes to adopt a project-specific Forest Plan amendment for elk habitat effectiveness (EHE) through the Travel Management Planning Project Record of Decision. The proposed amendment language is located in Chapter 1 of this document. This amendment would only apply to the Travel Management Planning EIS. The existing EHE standard in the Forest Plan would apply to all future projects, unless amended through those project decisions.

The Forest Plan requires EHE, (which is inversely related to open road density), to be maintained at 50 percent for third-order drainages that were “roaded” and 60 percent that were “unroaded” at the time the Plan was signed (USDA Forest Service 1987a, II-21).

Since the Forest Plan standard for EHE was implemented (USDA Forest Service 1987a), many, but not all, of the third-order drainages on the Forest have been brought into compliance with the standard through road use restrictions. Approximately 3,300 miles of roads have been identified as part of the Forest’s Transportation System at one time or another. These included roads on private lands within the Forest’s boundary, planned roads that were never constructed, substandard roads that were never constructed to the standard of a specified road, and roads constructed for forest management. About 134 miles of National Forest System roads have been decommissioned, recontoured, and removed from the Forest’s Transportation System. Additionally, about 195 miles have been hydrologically stabilized and placed into long-term storage. While the stored roads are no longer available for motorized public use, they remain on the Forest’s Transportation System, and would be available in the future for administrative use by Forest Service personnel. About 448 miles of system roads are closed to all motorized use year-round. About 595 miles of system roads are closed to full-sized vehicles year-round, but allow access by OHVs and/or motorcycles on either a seasonal or year-round basis. About 887 miles of system roads remain open year-round to use by highway-legal motorized vehicles, and about 569 miles of system roads remain open seasonally to use by highway-legal motorized vehicles. More than half of the roads that were once part of the Forest’s Transportation System are no longer open to full-sized vehicles {Project File document WILD-164.pdf}. Open road densities are inversely correlated with EHE, so this reduction in open road densities indicates a substantial but unquantified increase in EHE across the Forest over time.

The reduction in open road densities that has occurred in many third-order drainages has undoubtedly played a part in the dramatic increase in elk numbers in the Bitterroot drainage. Elk spring trend counts increased from 3,537 elk in 1987, when the Forest Plan was signed, to a high of 8,169 elk in 2005. Elk trend counts declined each of the next three years, and were down to 5,950 elk in 2008, but increased to 7,373 by 2014 {Project File WILD-052.pdf}. These changes in elk numbers occurred during a period when EHE was slowly improving as projects were implemented, implying that the changes were probably related to several factors including EHE. Despite these changes, the notable increase in elk numbers over the past 40 years, which is well distributed across the Forest (*Ibid*), appears to indicate that the elk population as a whole is able to tolerate the level of open road densities (and resulting EHE) that currently exist on the Bitterroot National Forest.

One hundred and eleven third-order drainages across the Forest are currently out of compliance with the Forest Plan EHE standard {Project File document WILD-053.pdf}. These drainages are listed in {Project File document WILD-055.pdf}, but are not identified individually here. An alternative that would have met the EHE standard in every third-order drainage across the Forest was considered but eliminated from detailed study (FEIS Chapter 2, Section 2.5). This alternative would have required closing approximately 504 miles of roads, which is about 33 percent of the 1,537 miles of roads currently open to full sized vehicles on the Forest. Many of these closures would have eliminated motorized access to important recreational facilities such as major road systems, popular trailheads, and several lookouts. The ID Team determined that this action would not be consistent with the Project's Purpose and Need to improve the quality of the recreational experience.

Alternatives 1 and 4 would bring one or more of these third-order drainages into compliance with the Forest Plan EHE standard, while **Alternative 3** would cause one additional drainage to be out of compliance with this standard. At least 70 third-order drainages would continue to not meet the EHE standard in all alternatives. Implementation of **Alternatives 1, 3 or 4** would thus require a project-specific Forest Plan amendment to allow EHE to remain below the standard in these drainages.

As stated above, elk populations have increased dramatically throughout the Bitterroot drainage since the Forest Plan was signed. Road use restrictions implemented on a project-level basis have improved EHE in some third-order drainages during this time, and many currently meet the EHE standard, while others do not. Despite not complying with specific Forest Plan standards for EHE in all third-order drainages, the Forest Plan objective of maintaining the current (1987) level of big-game hunting opportunities has been achieved and exceeded. The number of hunters, as well as the number of elk (until recently), has continued to increase, and the length of the general hunting season has remained at five weeks. The fact that the Forest continues to meet objectives for elk numbers appears to indicate that existing EHE levels are generally not a limiting factor for elk populations in the Bitterroot drainage.

Elk populations throughout the Bitterroot drainage have generally increased despite the fact that many third-order drainages across the Forest do not currently meet EHE standards. In most Bitterroot Hunting Districts, the 2004 Elk Management Plan (Montana FWP 2004, amended) objective is to stabilize or reduce the number of elk on winter ranges. The small improvement in EHE resulting from additional road use restrictions in the action alternatives would have only minor effects on EHE from a Forest-wide perspective, and will not likely have a measurable effect on the elk population in the Bitterroot Valley. Therefore, this amendment will contribute toward meeting the Forest Plan hunting opportunity objective by cooperating with the State of Montana to maintain their hunting opportunity and elk population goals. Elk numbers are so high in the Bitterroot drainage and across the range of elk in Montana and the rest of western North America that elk viability seems assured for the foreseeable future.

Since the adoption of the Forest Plan in 1987, seven site-specific amendments of the EHE requirement have been adopted. These are displayed below in Table 3.5-57.

Table 3.5- 57: Previous BNF Site-specific Forest Plan Amendments for EHE

Year	Number of 3rd Order Drainages	Environmental Document	Ranger District
1997	2	Camp Reimel EA	Sula
2001	3	Burned Area Recovery EIS	Darby, Sula, West Fork

Year	Number of 3rd Order Drainages	Environmental Document	Ranger District
2002	5	Slate Hughes Watershed Restoration & Travel Management	West Fork
2008	5	Trapper-Bunkhouse EIS	Darby
2008	2	Haacke Claremont EA	Stevensville
2010	5	Lower West Fork EIS	West Fork
2011	5	Three Saddles EA	Stevensville
2015	6	Darby Lumber Lands Watershed Improvement and Travel Management Project	Darby

Together with these previous EHE amendments, the cumulative effects of amending the EHE standard for the Travel Planning project will be imperceptible when considered at the Forest scale because the change in EHE requirements would not adversely affect the ability of the area to produce elk, and the Forest objective and goals for elk would continue to be met.

None of the present or reasonably foreseeable activities listed in Appendix A of this FEIS would have a detrimental effect on EHE in any of the third-order drainages within the Project Area. Some may improve EHE in some third-order drainages. An elk security analysis (Hillis et al. 1991) was added to the environmental analysis protocol which has proven to be a better tool than EHE analysis for achieving the Forest Plan objective to maintain elk populations and hunting season opportunities in cooperation with Montana Fish, Wildlife & Parks. In summary, the proposed activities, in combination with past and reasonably foreseeable activities in this analysis area, are not expected to cumulatively degrade the habitat effectiveness for elk.

B. Endangered Species Act

The Endangered Species Act requires that any federal agency action does not jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat.

Canada lynx and yellow-billed cuckoo (Western population) are the only threatened and endangered terrestrial wildlife species shown on the USFWS list of species that may occur on the Bitterroot National Forest {Project File document WILD-051.pdf}. The effects determination for yellow-billed cuckoo for all alternatives is No Effect. The effects determination for Canada lynx for all action alternatives is Not Likely to Adversely Affect (see FEIS Section 3.5.8, the Biological Assessment for Canada Lynx and Yellow-billed Cuckoo {Project File document WILD-171.pdf} and the USFWS concurrence letter {Project File document WILD-172.pdf}). None of the alternatives would jeopardize the continued existence of either species. Therefore, all of the alternatives would be consistent with applicable laws and regulations pertaining to threatened or endangered species.

C. Migratory Birds

President Clinton issued an Executive Order on "Responsibilities of Federal Agencies to Protect Migratory Birds" on January 10, 2001. In direct response to the Executive Order, the Forest Service and USFWS entered into a Memorandum of Understanding to strengthen migratory bird conservation through enhanced collaboration between the two agencies, in coordination with state, tribal, and local governments. **All of the action alternatives** would contribute to the conservation of migratory birds because they would reduce motorized disturbance effects to birds nesting near open routes.

The land bird monitoring program on the Bitterroot National Forest responds to regulatory direction to maintain viable populations of all native and desired non-native wildlife in habitats distributed throughout their geographic range on National Forest System lands. Although population differences are difficult to ascertain because the longest standing records are for only 20 years, and most of the monitoring work has been accomplished in the last 15 years, the monitoring program has not revealed declines in any species (FP-MON-035).

3.5.8 Determination Of Effects For Threatened, Endangered And Sensitive Wildlife Species

NORTHERN REGION

BIOLOGICAL ASSESSMENT/EVALUATION FOR TES WILDLIFE SPECIES
SUMMARY OF CONCLUSION OF EFFECTS

Note: A separate lynx BA is contained in the Project File as {Project File document WILD-171.pdf}
Project Name: Bitterroot National Forest Travel Management Planning Project

Species	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**
T & E Species				
Canada Lynx	NLAA	NE	NLAA	NLAA
Yellow-billed Cuckoo	NE	NE	NE	NE
Sensitive Species				
Bald Eagle	MIIH	NI	NI	MIIH
Bighorn Sheep	MIIH	NI	MIIH	MIIH
Black-backed Woodpecker	NI	NI	NI	NI
Coeur d'Alene Salamander	NI	NI	NI	NI
Fisher	MIIH	NI	MIIH	MIIH
Flammulated Owl	NI	NI	NI	NI
Gray Wolf	MIIH	NI	MIIH	MIIH
Long-eared Myotis	NI	NI	NI	NI
Long-legged Myotis	NI	NI	NI	NI
North American Wolverine	MIIH	NI	MIIH	MIIH
Northern Bog Lemming	NI	NI	NI	NI
Northern Leopard Frog	NI	NI	NI	NI
Peregrine Falcon	NI	NI	NI	NI
Western Big-eared Bat	NI	NI	NI	NI
Western Toad	MIIH	NI	MIIH	MIIH

Prepared by: _/s/ **David W. Lockman_____** Date: March 3, 2015
DAVID W. LOCKMAN
BNF North Zone Wildlife Biologist

NE = No Effect
NLAA = Not Likely to Adversely Affect
NI = No Impact
MIIH = May Impact Individuals or Habitat, but Will Not Likely Result in a Trend Toward Federal Listing or Reduced Viability for the Population or Species

3.5.9 CHANGES BETWEEN DRAFT EIS AND FINAL EIS

- Minor grammatical edits were made to correct typographical errors and to improve readability.
- Section 3.5.3 (Affected Environment and Effects to Wildlife); Table 3.5.1. Changed status of Yellow-billed Cuckoo from Candidate to Threatened to reflect USFWS final rule to list the species as threatened, dated 10/3/2014. Added Bighorn Sheep, Long-eared *Myotis* and Long-legged *Myotis* to the list as Sensitive species to reflect updates to the Regional Forester's Sensitive Species list in 2011. Added Mountain Goat to the list as a Species of Interest. Changed the summary determination column for Fisher and Pine Marten to reflect the addition of analyses for these species in Section 3.5.6 F and 3.5.6 J, respectively.
- Sub-section 3.5.5 A (Summer Travel Routes and Wildlife). Added additional discussion and references.
- Section 3.5.6 (Analysis of Project Effects to Selected Wildlife Species). Renumbered most sub-sections due to the addition of the Yellow-billed Cuckoo, Fisher, Bighorn Sheep, and American Marten sub-sections. The Gray Wolf sub-section changed from 3.5.6 B in the DEIS to 3.5.6 C in the FEIS. The Bald Eagle sub-section changed from 3.5.6 C in the DEIS to 3.5.6 D in the FEIS. The Wolverine sub-section changed from 3.5.6 D in the DEIS to 3.5.6 E in the FEIS. The Western Toad sub-section changed from 3.5.6 E in the DEIS to 3.5.6 G in the FEIS. The Elk sub-section changed from 3.5.6 F in the DEIS to 3.5.6 I in the FEIS. The Mountain Goat sub-section changed from 3.5.6 G in the DEIS to 3.5.6 K in the FEIS. The Migratory Birds sub-section changed from 3.5.6 H in the DEIS to 3.5.6 L in the FEIS. The Animal Movements, Migration, and Dispersal sub-section changed from 3.5.6 I in the DEIS to 3.5.6 M in the FEIS.
- Sub-section 3.5.6 A (Canada Lynx). Updated legal status section to reflect July 2, 2013 addition of lynx to the USFWS list of threatened, endangered and candidate species that may be present on the BNF as transients in secondary/peripheral lynx habitat. Updated narrative within other lynx sections to reflect this new status. Added lynx habitat acres based on the Forest's lynx habitat map, and added an analysis of lynx habitat acres open to over-snow vehicles. Added an analysis of road miles in lynx habitat, and the results of lynx monitoring efforts on the Forest. Added Tables 3.5-2, 3.5-3, 3.5-4, and 3.5-5. Added lynx trapping data in Ravalli County from FWP. Also added additional discussion and references pertaining to potential effects of over-snow vehicles and roads to lynx. Updated the lynx analysis based on changes to the alternatives since the DEIS. Updated the cumulative effects analysis to describe past activities that have affected lynx in the Bitterroot drainage. Added an Effects Determination section that summarizes the findings in the lynx Biological Assessment
- Sub-section 3.5.6 B (Yellow-billed Cuckoo). Added a brief sub-section, including a short habitat description, effects analysis and effects determination after this species was listed as Threatened by USFWS in October 2014.
- Sub-section 3.5.6 C (Gray Wolf). Added language tracking several changes in the legal status of gray wolves since the DEIS was published. Updated the direct and indirect analysis to reflect changes in road and trail miles, and acres open to over-snow vehicles resulting from changes to the alternatives since the DEIS. Updated the cumulative effects analysis to add the latest wolf monitoring data from USFWS, and to include further discussion of the impacts of past and ongoing projects. Changed the effects determination to better reflect potential impacts to wolves.
- Sub-section 3.5.6 D (Bald Eagle). Updated the cumulative effects analysis to include 2010 state-wide bald eagle monitoring data from FWP. Changed the description of Alternative 3 to show that it would not change the existing condition on Road #550 west of its junction with Road #13200. Changed effects determination for Alternative 3 to No Impact. Updated the cumulative effects analysis to describe past activities that have affected eagles in the Bitterroot drainage.
- Sub-section 3.5.6 E (Wolverine). Reorganized this section. Added additional narrative and citations to incorporate recent research findings and monitoring results. Added additional analysis based on modeled wolverine habitat map from Inman et al. (2013). Used that map as a base to determine the number of acres of predicted wolverine habitat open to over-snow vehicle use for each alternative, and the length of roads and trails open to motorized use within predicted wolverine habitat for each alternative. Updated the direct and indirect effects analysis to reflect changes in road and trail miles and the wildlife disturbance index since the DEIS in each alternative. Added Tables 3.5-6, 3.5-7, 3.5-8, 3.5-9, 3.5-10, and 3.5-11. Updated the cumulative effects analysis to describe past and ongoing activities that have affected wolverines in the Bitterroot drainage, and added wolverine trapping data from FWP.
- Sub-section 3.5.6 F (Fisher). Added an analysis sub-section for Fisher in response to public comments on the DEIS. Added Tables 3.5-12, 3.5-13, 3.5-14, and 3.5-15.

- Ø Sub-section 3.5.6 G (Western Toad). Added additional discussion and references to better document toad use of terrestrial habitats following the spring breeding season, and toad movements between breeding ponds and upland summer habitats. Added an analysis that evaluated the miles of roads and trails open to motorized use within 100 feet of streams, lakes, and ponds for each alternative, including several tables (3.5-16, 3.5-17, 3.5-18, 3.5-19, 3.5-20, and 3.5-21). Updated the existing analysis that evaluated miles of roads and trails open to motorized use across the Forest based on changes to the alternatives between DEIS and FEIS. Updated the cumulative effects analysis to describe previous activities that have affected toads in the Bitterroot drainage. Expanded and updated the effects calls to acknowledge that all of the action alternatives will result in some continued impacts to toads, even though some of them would implement changes that would be positive for toads.
- Ø Sub-section 3.5.6 H (Bighorn Sheep). Added an analysis sub-section for Bighorn Sheep to reflect the May 2011 addition of bighorn sheep to the Regional Forester's Sensitive Species List. Added Tables 3.5-22, 3.5-23, 3.5-24, and 3.5-25.
- Ø Sub-section 3.5.6 I (Elk). Added additional discussion and citations to the Synopsis of the Effects of Motorized Access to Elk to help describe potential impacts of motorized use to elk, and updated elk monitoring numbers to reflect data collected in 2008 through 2014 by FWP. Under the Affected Environment – Populations sub-heading, updated the three elk population charts with 2009 through 2014 elk data collected by FWP (Tables 3.5-26, 3.5-27, and 3.5-28), and added additional discussion and citations to document FWP's research studies on elk in the Bitterroot drainage.
- Ø Sub-section 3.5.6 I (Elk). Under the Elk Habitat Effectiveness (EHE) sub-heading, the total number of third-order drainages shown for the existing condition increased by 12 between the DEIS and the FEIS. This is because it was not known whether these 12 drainages were classified as "roaded" or "unroaded" at the time the Forest Plan was written, and thus it was not known which EHE standard should be applied to them for the DEIS. The correct "roaded/unroaded" status for these drainages has been determined (most fell into the "unroaded" category), and they were added to the EHE calculations in the FEIS. In addition, the third-order drainage layer in the Forest's GIS library includes large amounts of private land within some drainage boundaries. These private lands were inadvertently included in the open road density calculations in these drainages in the DEIS, which may have reduced the open road density, and in turn may have increased the EHE percentages in those drainages. These drainage boundaries were "clipped" to the Forest boundary for EHE calculations in the FEIS, which may have increased open road densities and reduced EHE percentages in some drainages for the existing condition. As a result, the FEIS shows 12 more third-order drainages than the DEIS did, and also shows that fewer drainages meet the EHE standard and more drainages do not meet the EHE standard than shown in the DEIS. Updated Tables for Number of Third-Order Drainages That Meet and Do Not Meet the EHE Standard to reflect these changes (Tables 3.5-29 and 3.5-37).
- Ø Sub-section 3.5.6 I (Elk). EHE numbers changed in some third-order drainages in some alternatives between the DEIS and the FEIS based on changes in whether some road segments would be designated as open or closed in those alternatives. These changes influenced the total number of third-order drainages that meet the EHE standard under each alternative, as well as the EHE percentages when combined on a Hunting District scale. Updated Tables for Elk Habitat Effectiveness Percentages by Hunting District to reflect these changes (Tables 3.5-40, 3.5-41, and 3.5-42), and also updated the discussions under each table to match the new EHE figures displayed in the tables.
- Ø Sub-section 3.5.6 I (Elk), under the Elk Habitat Effectiveness Index headings for both the Affected Environment and Effect of the Alternatives sections, added Tables 3.5-31 and 3.5-39 and discussion to quantify and evaluate the number of third-order drainages that would meet and not meet a Hypothetical EHE Index Guideline when including both open roads and trails to determine open route density.
- Ø Sub-section 3.5.6 I (Elk). Updated Tables for EHE Index (Table 3.5-32), Elk Security (Table 3.5-33), Elk Security During the Archery Season (Table 3.5-34), and Wildlife Core Security Area Percentages (Tables 3.5-35 and 3.5-44) to reflect changes in the applicable numbers for each table between the DEIS and the FEIS resulting from changes in whether some road and trail segments would be designated as open or closed in the various alternatives. Updated the discussion under each table to match the new figures displayed in the tables.
- Ø Sub-section 3.5.6 I (Elk), under the Elk Security Area Index heading in the Direct and Indirect Effects section, added Table 3.5-43 and discussion to quantify the miles of roads and trails closed during the archery season by alternative.

- Sub-section 3.5.6 I (Elk). Updated Table for Acres and Percentage of Elk Winter Range on the Bitterroot National Forest Open and Closed to Over-snow Vehicle Use (Table 3.5-45) for the Alternatives to reflect changes in the area open to over-snow vehicles between the DEIS and FEIS for each alternative. Also updated the discussion under the table to match the new figures displayed in the tables.
- Sub-section 3.5.6 I (Elk) under the Direct and Indirect Effects Summarized by Alternative subheading, updated the discussion under each alternative to reflect changes made to each analysis parameter.
- Section 3.5.6 I (Elk) under the Cumulative Effects section, updated elk population figures based on data collected by FWP in 2009 through 2014. Updated the cumulative effects analysis to describe past activities that have affected elk in the Bitterroot drainage.
- Sub-section 3.5.6 I (Elk). Moved the Analysis of the Elk Habitat Effectiveness Forest Plan Amendment from Section 3.5.6 I to Section 3.5.7.
- Sub-section 3.5.6 J (American Marten). Added an analysis sub-section for American Marten in response to comments on the DEIS. Added Tables 3.5-46, 3.5-47, 3.5-48, and 3.5-49.
- Sub-section 3.5.6 K (Mountain Goat). Added tables displaying the acres and percentage of goat spring, summer, and fall range outside the zone of motorized influence for the existing condition (Table 3.5-50) and for the alternatives (Table 3.5-52), and used numbers contained in these tables to update the analysis for the effects of the alternatives during the summer. Also added tables displaying the acres and percentage of goat winter range open to over-snow vehicle use for the existing condition (Table 3.5-51) and for the alternatives (Table 3.5-53), and used numbers contained in those tables to update the analysis for the effects of the alternatives during the winter. Updated the cumulative effects determination section to reflect these new figures, and added a heading and discussion to describe past activities that have affected goats in the Bitterroot drainage.
- Sub-section 3.5.6 L (Migratory Birds). Updated Table 3.5-55 and the discussion under the table to match the new figures displayed in the table.
- Sub-section 3.5.6. M (Animal Movement, Migration and Dispersal). Updated the discussion under Direct and Indirect Effects to reflect changes in roads and trails open to motorized use in each of the alternatives.
- Section 3.5.7 (Analysis of the Elk Habitat Effectiveness Forest Plan Amendment). Added a statement to clarify that the project-specific Forest Plan amendment would only apply to the Travel Management Planning EIS, and updated the number of third-order drainages that meet the Forest Plan standard for EHE in the discussion, (and in Section 3.5.6 H Table 3.5-31). Also added Table 3.5-56, which lists previous EHE site-specific amendments).
- Section 3.5.8 (Determination of Effects for Threatened, Endangered, and Sensitive Wildlife Species). Added the BA and BE Summary of Conclusion of Effects.